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Original Research Article

Skills Improvement Needs of Lecturers in the Utilization of selected Weather Instruments for Instructional Delivery in Tertiary Institutions in North-East Nigeria

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Abstract

The purpose of the study was to determine the skill improvement needs of lecturers in the utilization of weather instruments for effective teaching of students of agriculture in tertiary institutions in North-East, Nigeria. A survey research design was adopted for the study. Four research questions guided the study. The study was carried out in North-East, Nigeria. The population of the study was 219 respondents comprising of 17 Lecturers of Agricultural Education, 9 Lecturers of Soil Science, 8 Lecturers of Geography in Universities and 185 Lecturers of Agricultural Education in Colleges of Education. The entire population constituted the sample for the study. The instrument for data collection was a structured questionnaire named "Utilization of Weather Instruments Questionnaire" (UWIQ). Five experts validated the instrument and was trial-tested. A Cronbach Alpha reliability coefficient of 0.83 was obtained indicating that instrument was reliable to elicit information for the work. Two hundred and nineteen copies of the questionnaire were administered to the respondents by six trained research assistants in the six States of North-East, Nigeria. The entire questionnaire was retrieved. The data collected were analyzed using weighted mean and improvement need index (INI) to answer the 4 research questions. It was found that all the 64 skill improvement needs identified in the utilization of weather instruments were needed by Lecturers of Agricultural Education in Colleges of Education. The result revealed that Lecturers of Agricultural Education need skill improvement on the following items: 19 skills on utilizing Stevenson Screen, 16 skills on utilizing Thermo-hygrograph, 20 skills on utilizing Maximum and Minimum Thermometers and 10 skills on utilizing Sunshine Recorder. Based on these findings, it was recommended that: Lecturers of Agricultural Education should seek for ways of improving their skills in utilizing weather instruments; Administrators of Colleges of Education should support and approve study leave for Lecturers of Agricultural Education to attend workshops, seminars and conferences on utilization of weather instruments; Skill acquisition organizations should package the finding of the study into capacity building programmes for re-training both Lecturers of Agricultural Education in Colleges of Education and teachers of Agriculture Science in Secondary Schools in North-East, Nigeria.

Keywords: Improvement, Skills, Tertiary Institutions, Utilization, Weather Instruments

INTRODUCTION

Agricultural Education programme is a course of study in Universities and Colleges of Education. On the other hand, Osinem (2007) perceived Agricultural Education as a process of imparting knowledge, skills and attitudes in agriculture to the learner at any level. In the view of Ukonze and Olaitan (2010), Agricultural Education is described as a programme designed for preparing or equipping learners with knowledge, skills and attitude in teaching and technical areas of agriculture to enable them impart same to students in Schools and Colleges. In the opinion of Akpomedaye (2011), Agricultural Education is an occupational education design to develop

a particular knowledge and skills associated with various farming designs. In this study, Agricultural Education is a programme in Colleges of Education and other tertiary institutions designed with series of activities for equipping students with knowledge, skills and attitude in pedagogy in agriculture required for effective teaching of content areas in agriculture to students in primary and secondary schools after graduation.

Agricultural Education as a course of study is offered in tertiary institutions. Tewarie (2014) asserts that tertiary institutions are those institutions that are involved in teaching and learning processes that occurs following the completion of Secondary School Education and provide academic credits and competencies that lead to certificates, diplomas and degrees from Universities, Polytechnics, Colleges and similar institutions. Odionye (2014) maintained that tertiary institutions are those higher institutions that provide education after Secondary Education in Universities, Polytechnics, Colleges of Education, Monotechnics, including institutions offering corresponding courses. A College of Education is a tertiary institution that offers three years minimum training to students in programmes of interest such as Agricultural Education for entry into teaching profession (Federal Republic of Nigeria (FRN), 2004). The objectives of Agricultural Education programme in College of Education are to:

1. prepare graduates with right attitudes and knowledge/professional competence in vocational agriculture;
2. produce teachers who will be capable of motivating students to acquire interest in and aptitude for agriculture;
3. develop in the student-teachers the appropriate communication skills for effective transmission of agricultural information and skills to the students in the context of their environment;
4. equip the student-teachers with adequate knowledge and ability to establish and manage a model school farm effectively; and
5. provide a sound background to enhance further academic and professional progression of the students (National Commission for Colleges of Education (NCCE), minimum standard, 2012).

In order to achieve the above objectives, the National Commission for Colleges of Education in its Minimum Academic Standard clearly listed courses to be offered by students in Agricultural Education to cover: Introduction to agriculture, Poultry production, Fish production, Principles of farm management, Youth organization in agriculture, Horticulture, Land survey and farmstead planning, Agro-climatology, among others (NCCE, 2012). This study is focused on skill improvement needs on weather instruments in agro-climatology aspect of the programme.

The study of climates as applied to the effect on the productivity of plants and animals of agricultural importance is called agro-climatology. In the view of Saravanan (1994), Agro-climatology is defined as the meteorological, climatological and hydrological conditions which are significant for agriculture owing to their integration with the objects and process of agricultural production. Climate Prediction Centre, US report (2006), explained that agro-climatology is the study of climate in relation to its effects on water, soil, crop and livestock. Chang (2013) viewed agro-climatology as the study of climate in relation to the productivity of plants and animals of agricultural importance. The author reiterated that the main aim of agro-climatology is to obtain necessary information about climate and apply them for the purpose of improving farming practices and increasing agricultural productivity in quantity and quality. In Agricultural Education programme of Colleges of Education, the objectives of agro-climatology as contained in the curriculum of NCCE, minimum standard (2012) are to:

a. prepare graduates with basic knowledge in scope and general principles of agro-climatology;
b. develop in student-teachers the appropriate skills in operating equipment used in agro-climatology;
c. produce teachers who will be capable of explaining and predicting the effects of climatic elements on crops, livestock and soil in the ecological zones of Nigeria, and
d. equip the student-teachers with adequate knowledge and ability to forecast weather for agricultural benefits.

The objectives of agro-climatology are contained in the content which includes the meaning and scope of agro-climatology and equipment used in the study, ecological zones of Nigeria and their effects on distribution of crops, livestock and soil formation and principles underlining weather forecasting (NCCE, 2012). The objectives of agro-climatology are achieved with effective use of weather instruments that serve as instructional materials to teach students of agriculture in Colleges of Education.

Instrument is a device for measuring or displaying something. In the view of Ahrens (2009), instrument is a tool or device used for a particular task, especially for delicate or scientific work. In this study, instruments are those tools and devices used by lecturers of agricultural education as instructional materials to teach agro-climatology to students. The weather instruments required for the study of agro-climatology include: Stevenson's screen, Thermo hygrographs, Maximum and Minimum thermometers, Rain gauge, Measuring glasses, Wind vane, Anemometer, Evaporation meter, Hygrometers, Sunshine Recorder and Barometers (NCCE, 2012). These weather instruments are recommended to be used by lecturers for instructional delivery of the content of agro-climatology in agricultural education programme in Colleges of Education.

The National Policy on Education (FRN, 2004), stated that a lecturer is a person who had undergone approved professional training in education at appropriate levels and is capable of imparting knowledge, skills and

attitudes to the learners in a relevant programme. A lecturer of Geography is someone who has undertaken a teacher training programme in the University with the mandate of teaching Geography to students (Okunrotifa, 1999). A lecturer of Soil Science is an individual who delivers instruction to students in Soil Science in the Universities. On the other hand, a lecturer of Agricultural Education, as explained by Isiwu and Okonkwo (2013), is a person who had undergone a teacher preparatory programme in the University and saddled with the responsibility of imparting knowledge, skills and attitudes in agriculture to students. Lecturers in this study are individuals who had undergone training in pedagogical and technical aspects of Agricultural Education programme in a University and have the onus of teaching agro-climatology to students of agriculture in Colleges of Education and other tertiary institutions. The lecturers of Agricultural Education teach courses in agricultural education including agro-climatology and evaluate them for competence before they are allowed to graduate. The lecturers utilize the recommended weather instruments by the NCCE in the Minimum Standard for instructional delivery of agro-climatology to students.

Students, as defined by Simanek (1997), are those persons who attend a School, College or university to study and learn something. The author added that persons following a course of study as in a School, College or University are students. A student as described by Miriam (2012) as someone who is admitted into an institution such as College or University. A student is a leaner, or someone who attends an educational institution to study a subject or course. Collins (2013) viewed a student as a learner or scholar who attends a school to seek knowledge from professional teacher or books. Students are learners who were admitted into College of Education to study Agricultural Education programme (Asogwa, Isiwu and Jumbo, 2014). Students in this study refer to individuals who are enrolled in the Department of Agricultural Education in a College of Education and other tertiary institutions, which are either owned by the Federal Government, State Government or private organization(s) and offers agro-climatology. These students are taught agro-climatology by lecturers with the utilization of the aforementioned weather instruments.

Utilization is the art of using something especially for practical purpose (Olagunju and Abioma, 2008). The authors emphasized that utilization is the process of managing and organizing resources in teaching which brings about fruitful learning since it stimulates students sense as well as motivating them. In the view of Asogwa, Onu and Egbo (2013), utilization is how often an instructional material in fish production is put to use by teachers of agriculture in secondary schools. In this study, utilization is the ability of the lecturers of Agricultural Education to operate weather instruments for instructional delivery to students in Colleges of Education and other tertiary institutions. The lecturers use the weather instruments to equip the students with knowledge and skills required for operating them for agricultural production in their environment.

Usually the term skill is used to refer to a level of performance in the sense of accuracy and speed in performing particular tasks (Winterton, Delamane- Le Deist and Stringfellow, 2006). In the submission of Daramola (2008), skill is a well established habit of doing things which involves the acquisition of performance capability. The author maintained that to possess skill is to demonstrate the habit of thinking, acting and behaving in a specific activity in such a way that the process becomes normal to the individuals through practice and repetition. In the view of Aji and Ari (2010), skill is the ability to do something expertly and well. They reiterated that skill is an organized sequence of action, proficiency, executed and usually displaying a flexible but systematic temporal patterning. Akpomedaye (2011) maintained that skill is a well established habit of doing something involving the acquisition of performance capability. Adeyemi (2012) established that skill is the ability to perform a task. Asogwa, Olaitan and Asouzu (2013) explained skills as well established habit of doing things by people. In this study, skill refers to the specific abilities possessed by lecturers in utilizing weather instruments for instructional delivery to students in Colleges of Education and other tertiary institutions. It is the expectation of Government that the students should acquire skills in operating the weather instruments from their lecturers before graduation. This will enable the students to effectively teach the use of such weather instruments to students in Junior Secondary Schools during teaching practice and after graduation to enhance agricultural production. Perhaps, since some of the Lecturers in tertiary institutions could have same challenges in the skills for operating weather facilities, and have the need for skill improvement.

Nonetheless, improvement is the act of making something better. Improvement in the view of Eze and Adeyemi (2012) is the act of making the skills possessed by women farmers in the area better for successful performance of specific tasks involved in bitter leaf production. On the other hand NHS Institute for Innovation and Improvement (2013) reported that improvement is continually working together to enhance the experience and outcomes for patients and users and looking for the other ways to provide health and social care that continually enhance the way it meets the needs of those who depend on it and the working lives of staff who provide it. Improvement in the context of this study is the continual act of making the skills possessed by lecturers of Agricultural Education better for utilization of weather instruments for instructional delivery to students of agriculture. To improve the skills of the lecturers on the utilization of weather instruments, it is necessary to first of all determine the level of skills possessed by the

lecturers and what they need more for instructional delivery through need assessment.

Need assessment, as defined by Migrant Education (2001), is a systematic set of procedures that are used to determine needs, examine their nature and causes, and set priorities for future action. The office added that need assessment focuses on the ends (outcomes) to be obtained, rather than the means (process). In the opinion of Ville de Goyet and Morinière (2006) need assessment is the evaluation of an affected population's situation, aiming to inform decisions about whether and how to provide relief assistance. McCawley (2009), viewed need assessment as a systematic approach to study the state of knowledge, ability, interest or attitude of a defined audience or group involving a particular subject. The author revealed that need assessment provides a method to learn what has already been done and what gaps in learning remains. Also that need assessment is conducted to verify the audience's level of knowledge and skills, its interest and opinions or its learning habits and preferences. Collecting and analyzing needs assessment data allows the investigator to describe the "gap" between what exists and what is needed thus finding ways of filling the gap. In this study, need assessment is systematic procedures for determining what gap exist in skills possessed by lecturers in utilizing weather instruments, what they need to posses more for instructional delivery to students of agriculture in Colleges of Education and other tertiary institutions. The difference between what they possess and what they need to possess in utilizing weather instruments will represent the need gap.

Need gap, as explained by Migrant Education (2001) is a discrepancy or gap between "what is" and "what should be". Rosett and Sheldon (2001) described need gap as the difference between the perceived need and actual need. The authors stressed that need gap can be obtained by subtracting the perceived need level from the actual need level. Need (skill) gap as reported by United Kingdom (UK) Commission for Employment and Skills (2013), are instance in which individuals lack skills in a particular area, preventing them from performing their job effectively. This is the difference that exists between the perceived need and the felt need. In this study, need gap is the discrepancy between the level of capabilities of lecturers and their expected capabilities in the utilization of weather instruments. In order to determine the level of capabilities of the lecturers in the utilization of weather instruments as well as ascertain what they need to know more in order to be effective in utilizing weather instruments for instructional delivery to students in Colleges of Education and other tertiary institutions requires need gap analysis.

Need gap analysis, as presented by Rosett and Sheldon (2001) is the tool that is used by an individual, a group or a company to compare its present performance with its potential performance. Need gap analysis is comparing the best practices identified with the processes currently in place in an organization's practices and the identified best practices for improvement, McGrath (2006) observed. Herder and Olmedilla (2010) reported that gap analysis is a tool that is used to identify gap between the current situation and the future state to reach along with the tasks needed to complete to close the gaps. UK Commission for Employment and Skills (2013) explained that need (skill) gap analysis is a systematic review of the skills held by individuals in a company which involves identifying all the skills required by individuals to carry out their job role effectively followed by the employers identifying the critical and non critical skills required to achieve a higher standard of work by comparing the list of required skills with the actual skills possessed by the individual employee. With reference to this study, need gap analysis is the computation of the mean values of the actual performance of lecturers subtracted from the computation of the mean values of their expected performance in utilization of weather instruments. The result obtained gives the need gap value which indicates the skill improvement needs of the lecturers in the utilization of weather instruments in tertiary institutions in North-East Nigeria.

Statement of the problem

The occupation of the population of people in North-East, Nigeria is farming. The farming activities are mostly affected by the climatic conditions of the zone, where the average rainfall is under 1000mm and temperature over 23^0C (Aregheore, 2010). The climatic factors are not static; they fluctuate with the passage of years, which is a global phenomenon. Adakayi (2012) reported in his study that there was lower temperature and rainfall between 1970s and 1980s and higher temperature and rainfall between 1990s and 2000s. Ladan (2014) indicated that daily rainfall records of 30 years in Northern Nigeria revealed the impact of global climate change in form of increasing number of dry spells during the rainy season leading to drought and desertification. These fluctuations of the climatic factors affect agricultural activities of the populace in Northeast Nigeria as they depend on the natural phenomena. The Federal Government of Nigeria perceived the need to improve the agricultural activities of Nigerians to enhance food production, and have introduced the study of Agricultural Education as a course of study in Universities and Colleges. The Colleges of Education through directives of the National Commission for Colleges of Education minimum standard employ qualified lecturers to teach Agricultural Education to students. The lecturers teach weather instruments in agro-climatology to students, which they are evaluated for competence and mastery for the award of Nigeria Certificate in Education (NCE).

The researcher observed that the Teachers of Agricultural Science in Secondary Schools could not utilize the weather instruments, which made the researcher to engage in discussions with them in secondary schools during teaching practice supervision. It was discovered that they found it difficult to teach and even utilize weather facilities where they exist. The teachers indicated that they had problems of preparation by their lecturers in Colleges of Education as they concentrated mostly on the theoretical aspect of weather instruments. Indeed, this is in consonant with the finding of Atsumbe (2012) who revealed that students were loaded with the theoretical knowledge aspect of the programme of study than the practical aspect by the lecturers in tertiary institutions. The Nigeria Certificate in Education (NCE) teachers of agriculture in Secondary Schools associated their difficulties in demonstrating with weather instruments to their preparation procedures.

The Lecturers of Agricultural Education in Colleges of Education and other tertiary institutions are generally prepared in technical and pedagogical areas of agriculture from Nigerian Universities and are obliged to work in any College of Education in North-East Nigeria where opportunities exist (Isiwu & Okonkwo, 2013). However, from the observations and discussion of the researcher with the teachers of agriculture in some secondary schools during teaching practice supervision, it reveals that lecturers of Agricultural Education in North-East Nigeria like any other College of Education in Nigeria need skills improvement in the utilization of weather instruments for instructional delivery to students in Tertiary institutions, therefore the necessity for this research.

PURPOSE OF THE STUDY

The purpose of the study was to determine the skill improvement needs of lecturers in the utilization of weather instruments for instructional delivery to students of Agricultural Education in tertiary institutions (Colleges of Education) in North-East, Nigeria. Specifically, the study focused on the determination of:

i. Skills improvement needs of Lecturers in utilizing Stevenson screen for instructional delivery to students in Colleges of Education;
ii. Skills improvement needs of Lecturers in utilizing thermo hygrographs for instructional delivery to students in Colleges of Education.
iii. Skills improvement needs of Lecturers in utilizing minimum and maximum thermometers for instructional delivery to students in Colleges of Education; and
iv. Skills improvement needs of Lecturers in utilizing sunshine recorder for instructional delivery to students in Colleges of Education.

Research Questions

The following research questions guided the study:

1. What are the skills improvement needs of Lecturers in utilizing Stevenson screen for instructional delivery to students in Colleges of Education?
2. What are the skills improvement needs of Lecturers in utilizing thermo hygrograph for instructional delivery to students in Colleges of Education?
3. What are the skills improvement needs of Lecturers in utilizing minimum and maximum thermometers for instructional delivery to students in Colleges of Education? and
4. What are the skills improvement needs of Lecturers in utilizing sunshine recorder instructional delivery to students in Colleges of Education?

METHODOLOGY

The study adopted the survey research design. This is a design in which group of people or items is studied by collecting and analyzing data from people or items considered to be representative of the entire group.(Nworgu, 2006). The area of the study was North-East, Nigeria comprising of Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe states. The population of the study was 219 made up of 17 Lecturers of Agricultural Education in Universities, 9 Lecturers of Geography and 8 Lecturers of Soil Science in the Universities and 185 Lecturers of Agricultural Education in the Colleges of Education, all from North-East, Nigeria. The sample for the study was 219 which was the entire population of the respondents.

The instrument for data collection was a structured questionnaire named “Utilization of Weather Instruments Questionnaire” (UWIQ). The questionnaire was divided into parts, 1 and 2. Part 1 sought information on the personal data of the respondents while part 2 sought information from the respondents on utilization of weather instruments. Part 2 was organized based on the selected weather instruments forming the sections. Section A dealt with Stevenson Screen (19 items), section B on Thermo Hygrograph (16 items), section C on Maximum and Minimum Thermometers (20 items) and section D on Sunshine Recorder (10). Each section had response categories of needed and performance. The needed category had a 4-point response options of highly needed (HN), averagely needed (AN), slightly needed (SN) and not needed (NN) while the performance categories had a 4-point response options of high performance (HP), average performance (AP), low performance (LP) and no performance (NP) with corresponding values of 4,3,2 and 1 respectively. The questionnaire was divided into parts, 1 and 2. Part 1 sought information on the personal data of the respondents while part 2 sought information from the respondents on utilization of weather instruments.

Part 2 was organized based on the selected weather instruments forming the sections. Section A dealt with Stevenson screen (19 items), section B on Thermo hygrograph (16 items), section C on Maximum and Minimum thermometers (20 items), section D on Rain gauge (19 items), section E on Wind vane (8 items), section F on Anemometer (10 items), section G on Hygrometer (14 items), section H on Barometer (8 items), section I on Sunshine recorder (10) and section J on Evaporation meter (11 items), Each section had response categories of needed and performance. The needed category had a 4-point response options of highly needed (HN), averagely needed (AN), slightly needed (SN) and not needed (NN) while the performance categories had a 4-point response options of high performance (HP), average performance (AP), low performance (LP) and no performance (NP) with corresponding values of 4,3,2 and 1 respectively.

The instrument was face and content validated by 5 experts. It was submitted to 5 experts; 2 from Agricultural Education Department, Federal University of Agriculture, Makurdi, 2 from Vocational Education Department, Modibo Adama University of Technology Yola and 1 from Foundations Department, College of Education, Zing. These experts were required to read the questionnaire items thoroughly and correct wrong spellings, wrong information and unclear or ambiguous statements on the questionnaire items. They were requested to remove any information that was not necessary and or add any missing information that was needed. The corrections and suggestions by the experts were used to develop the final copy of the instrument for data collection. The Cronbach Alpha value of 0.83 was determined which was high enough indicating that the instrument (UWIQ) was reliable to elicit data for the work. The trial testing was conducted in Benue State and not in North-East, Nigeria in order to avoid any study bias. The researcher employed the services of six research assistants (one from each State) to help in the administration of the UWIQ on the respondents in their respective States. The research assistants were trained on how to administer and retrieve the instruments from the respondents.

A total of 219 copies of the questionnaire were distributed to the respondents through the six research assistants who in turn retrieved all the questionnaire after having checked the responses on each questionnaire item. The data collected from the respondents were analyzed using weighted mean and Improvement Need Index (INI) to answer the research questions 1 to 10. Student t-test was used to test the null hypotheses at 0.05 level of significance. The decision on the needed category was based on the real limits of numbers as follows:

Highly Needed = 3.50 – 4.00
Averagely Needed = 2.50 – 3.49
Slightly Needed = 1.50 – 2.49
Not Needed = 1.00 – 1.49

Questionnaire items with a mean value of 3.50 to 4.00 was considered as highly needed, 2.50 to 3.49 was considered as averagely needed, 1.50 to 2.49 was regarded as slightly needed while any item with a mean value below 1.50 was regarded as not needed. The general decision was that any item with a weighted mean of 1.50 and above was considered as needed while any item with weighted mean less than 1.50 was considered as not needed. Standard deviation was used to describe the closeness or dispersion of the opinion of the respondents from the mean and from one another.

The Improvement Need Index (INI) was used to determine the need gap value of lecturers of Agricultural Education as follows:

a. The weighted mean X_n of the needed response option for each item will be calculated.

b. The weighted mean X_p of the performance response option for each item will be calculated.

c. The need gap (NG) will be determined by calculating the differences between the values of X_n and X_p for each item. That is, $NG = X_n - X_p$.

Where NG is zero (0), it means improvement was not needed because the level at which the lecturers of Agricultural Education could perform that item was equal to the level at which it was needed. Where NG was positive (+) it means improvement was needed because the level at which lectures of Agricultural Education could perform that item was lower than the level at which it was needed. Where NG was negative (-) it means improvement was not needed because the level at which lecturers of Agricultural Education could perform that item was greater than the level at which it was needed (Eze & Adeyemi, 2012 and Eze & Asogwa, 2013).

RESULTS

Results of the study were presented in the tables below.

Data in Table 1 revealed that the Need-Performance Gap Value of the nineteen (19) skills ranged from 0.74 to 1.04 and were positive. This indicated that lecturers of Agricultural Education need improvement on all the 19 skills in utilizing Stevenson screen for effective teaching of students in Colleges of Education in North-East Nigeria.

Data in Table 2 revealed that the Need-Performance Gap Value of the nineteen (16) skills ranged from 0.78 to 1.06 and were positive. This indicated that lecturers of Agricultural Education need improvement on all the 16 skills in utilizing Thermo hygrograph for effective teaching of students in Colleges of Education in North-East Nigeria.

Data in Table 3 revealed that the Need-Performance Gap Value of the nineteen (20) skills ranged from 0.91 to 1.09 and were positive. This indicated that lecturers of Agricultural Education need improvement on all the 19 skills in utilizing Maximum and Minimum thermometers

Table 1. Need-performance gap analysis on Skills Improvement needs of Lecturers in Utilizing Stevenson Screen for instructional delivery to students in Colleges of Education (n = 196)

S/N	Item statement	Xn	Xp	Xn-Xp NPG	Remark
1.	Identify instrument used for storing thermometers	3.81	2.87	0.94	SIN
2.	Make the box of wooden material	3.75	2.85	0.90	SIN
3.	Provide louvers on the box	3.71	2.83	0.88	SIN
4.	Make roof of box of double boarding	3.71	2.82	0.89	SIN
5.	Paint the box white	3.66	2.86	0.81	SIN
6.	Place box on leveled ground 7m x 7m	3.69	2.80	0.89	SIN
7.	Place box 1.21m above ground	3.62	2.81	0.81	SIN
8.	Place door of the box facing north	3.66	2.81	0.85	SIN
9.	Install the door to open downward	3.60	2.81	0.79	SIN
10.	Place box free from trees and buildings to prevent shade	3.65	2.76	0.89	SIN
11.	Place box at a distance twice the height of trees and buildings	3.50	2.74	0.76	SIN
12.	Level the box as it is mounted, must not be tilted	3.54	2.77	0.77	SIN
13.	Keep we- and dry- bulb thermometers in the box	3.59	2.73	0.86	SIN
14.	Keep no large objects in the box which would block air flow	3.54	2.75	0.74	SIN
15.	Take reading at right angle to the thermometer stem	3.63	2.78	0.85	SIN
16.	Read and set the thermometer twice daily	3.64	2.78	0.86	SIN
17.	Record your reading	3.57	2.73	0.84	SIN
18.	Compare reading frequently with those of ordinary thermometer to avoid error development	3.76	2.73	1.03	SIN
19.	Store thermometers away from strong sources of heat as the thermometer can burst	3.75	2.71	1.04	SIN

Xn = Mean of needed, Xp = Mean of performance, NPG= Need-Performance Gap, SIN = Skills Improvement Needed.

Table 2. Need-performance gap analysis on Skills Improvement needs of Lecturers in Utilizing Thermo Hygrograph for instructional delivery to students in Colleges of Education (n = 196)

S/N	Item statement	Xn	Xp	Xn-Xp NPG	Remark
1.	Identify and source the instrument used for recording both Temperature and Relative Humidity	3.69	2.70	0.99	SIN
2.	Hang up the write arms into the arm holders in transporting the instrument	3.71	2.86	0.85	SIN
3.	Site the instrument in a location such that it is not affected by any external temperature/ humidity sources	3.69	2.87	0.82	SIN
4.	Install the instrument on a table or hang on the wall	3.64	2.83	0.81	SIN
5.	Set the write arm fibres onto the write arms	3.57	2.77	0.80	SIN
6.	Set the clockwork for recording 1day (daily revolution cycle), 7day (weekly revolution cycle) or 31day (monthly revolution cycle)	3.58	2.78	0.80	SIN
7.	Select the correct period chart for fitting into the instrument	3.67	2.78	0.89	SIN
8.	Rotate the recording drum gently in anticlockwise direction until the pens on the chart are aligned to the correct time/day	3.67	2.77	0.90	SIN
9.	Install the bottom side of the chart paper directly on the border in the lower edge of the recording drum	3.66	2.68	0.98	SIN
10.	Read the temperatures recorded on the upper half of the chart	3.60	2.62	0.99	SIN
11.	Read the Relative humidity recorded on the lower half of the chart	3.60	2.65	0.95	SIN
12.	Remove the write arm fibre from the write arm and replace with a new one	3.64	2.55	1.09	SIN
13.	Remove chart paper at the end of drum revolution cycle by pressing the clamp from down to the top at the bottom side of the drum	3.59	2.63	0.96	SIN
14.	Change the revolution cycle by removing the recording drum upwards from the clockwork	3.61	2.55	1.06	SIN
15.	Replace a new chart paper under the clamp and press it up to locking	3.61	2.58	1.03	SIN
16.	Drop methylated spirit on the dry pens to reactivate them	3.57	2.59	0.98	SIN

Xn = Mean of needed, Xp = Mean of performance, NPG= Need-Performance Gap, SIN = Skills Improvement Needed.

Table 3. Need-performance gap analysis on Skills Improvement needs of Lecturers in Utilizing Maximum and Minimum Thermometers for instructional delivery to students in Colleges of Education (n = 196)

S/N	Item statement	Xn	Xp	Xn-Xp NPG	Remark
1.	Identify the instruments used to measure temperature	3.55	2.60	0.95	SIN
2.	Identify and source the type of thermometers from the market	3.57	2.54	1.03	SIN
3.	Insert each thermometer into a protective shealth with two rings and hang on the brass hooks in the screen	3.65	2.51	1.14	SIN
4.	Install the thermometers out of direct sunlight so that it reads the temperature of the air.	3.64	2.53	1.11	SIN
5.	Read temperature in degree Celsius (^{0}C)	3.57	2.51	1.06	SIN
6.	Read the temperature to the nearest whole degree	3.64	2.59	1.05	SIN
7.	Read the highest and lowest temperatures	3.61	2.63	0.99	SIN
8.	Stand 25cm from the thermometers to avoid breathing on it	3.57	2.62	0.96	SIN
9.	Hold the thermometers away from your breath	3.62	2.59	1.03	SIN
10.	Avoid use of matches to light to read thermometers at night	3.55	2.63	0.92	SIN
11.	Read temperatures on the thermometers at night using flash light	3.62	2.68	0.94	SIN
12.	Read maximum mercury thermometer at eye level	3.63	2.67	0.96	SIN
13.	Read maximum mercury thermometer at right angle	3.67	2.65	1.01	SIN
14.	Read minimum alcohol thermometer at right angle to the nearest half degree	3.70	2.55	1.15	SIN
15.	Convert degree Fahrenheit to degree Celsius	3.68	2.55	1.13	SIN
16.	Place the thermometer in shade to avoid sunshine	3.66	2.60	1.06	SIN
17.	Reset indices of thermometer magnetically or by tilting after reading	3.58	2.64	0.94	SIN
18.	Reset indices of thermometer after reading by tilting	3.66	2.56	1.09	SIN
19.	Record reading and keep for future use	3.59	2.60	0.99	SIN
20.	Clean the thermometers occasionally	3.66	2.64	1.02	SIN

Xn = Mean of needed, Xp = Mean of performance, NPG= Need-Performance Gap, SIN = Skills Improvement Needed.

Table 4. Need-performance gap analysis on Skills Improvement needs of Lecturers in Utilizing Sunshine Recorder for instructional delivery to students in Colleges of Education (n = 196)

S/N	Item statement	Xn	Xp	Xn-Xp NPG	Remark
1.	Show the instrument used to record sunshine	3.48	2.60	0.88	SIN
2.	Source sunshine recorder from the market	3.52	2.54	0.98	SIN
3.	Show the duration of sunshine by a trace of scorched special card by the burning action of sun focused on the card by a glass sphere	3.55	2.53	1.03	SIN
4.	Demonstrate how the card fits into the grooves of the metal bowl of the sunshine recorder	3.50	2.54	0.97	SIN
5.	Install the instrument on a concrete pillar in the open about 1-5m above the ground to prevent the effect of nearby trees and buildings	3.47	2.63	0.84	SIN
6.	Utilize Campbell-stocks sunshine recorder to concentrate sun rays on sensitized card graduated in hours and minutes	3.48	2.63	0.85	SIN
7.	Determine the total duration of sunshine for the day by calculating the total length of burnt cards graduated in hours and minutes	3.47	2.63	0.84	SIN
8.	Demonstrate with Jordan sunshine recorder using a can with a pinhole on one side to let sunlight in	3.45	2.63	0.82	SIN
9.	Read the sun's movement across the sky using Jordan sunshine recorder with photographic paper wrapped inside	3.45	2.65	0.80	SIN
10.	Demonstrate what time of the day with sundial that uses shadow cast by the sun	3.49	2.58	0.91	SIN

Xn = Mean of needed, Xp = Mean of performance, NPG= Need-Performance Gap, SIN = Skills Improvement Needed.

for effective teaching of students in Colleges of Education in North-East Nigeria.

Data in Table 4 revealed that the Need-Performance Gap Value of the nineteen (10) skills ranged from 0.80 to

1.03 and were positive. This indicated that lecturers of Agricultural Education need improvement on all the 10 skills in utilizing Sunshine recorder for effective teaching of students in Colleges of Education in North-East Nigeria.

DISCUSSION

In Table 1, it was found from the study that lecturers of Agricultural Education in Colleges of Education need improvement on 19 skills in utilizing Stevenson screen for instructional delivery to students. The skills where the lecturers need improvement include; identify the instrument used for storing thermometers, make the box of wooden material, provide louvers on the box, make roof of box of double boarding and paint the box white, among others. This finding is in agreement with the studies of Eze and Adeyemi (2012) on work skill improvement needs of women farmers in bitter leaf production for sustainable income in Abakaliki, Nigeria who indicated that women farmers needed skill improvement in 10 skills nursery preparation, 13 skills in pre-planting and planting and 16 skills in post planting and post harvesting operations. The skills include; transplant the bitter leaf seedlings, irrigate the seedling farm daily for four weeks after transplanting, weed garden regularly and apply poultry manure at the rate of 15 tones/ha among others. The result of the study is also in consonance with the study of Eze and Asogwa (2013) on technical skill capacity building needs of lecturers of agricultural education in organic farming for effective delivery to students in Universities in South Eastern Nigeria who found out in their study that lecturers of agricultural education need skill improvement in 13 skills in crop rotation, 10 skills in green manuring, 21 skills in composting and 8 skills in biological pest and weed control. Such skills include; select appropriate cite that is not water logged, map out square plots 1m x 1m x 3m and label the plots A, B, C, 1, 2, 3 and 4, source compost manure such as plant and animal residue, spray the solution on crop appropriately among others.

The result on Table 2 showed lecturers of Agricultural Education in Colleges of Education need improvement on 16 skills in utilizing Thermo hygrograph for instructional delivery to students. The skills include identify and source the instrument used for recording of both temperature and humidity, hang up the write arm into the arm holders in transporting the instrument and site the instrument in a location such that it is not affected by any external temperature/humidity sources. This study is in consonance with the study of Ibezim, Ohanu and Shodeinde (2014) on skill capacity building needs of electronic technology lecturers for integration of mobile phone hardware repair into the electronic curriculum. They found out that electronic technology lecturers need improvement on 17 skills on phone components identification, 14 skills on repair tools identification, 10 skills on disassembly and assembly of mobile phones, 16 skills on identification of mobile phone hardware fault and 16 skills on remedying of hardware faults. The skills include; remove the battery cover, remove the battery, remove the SIM card, remove the Memory card and unplug the screen and other parts attached to the circuit board by ribbon flex among others. The study is also in agreement with the study of Kadzera (2006) on use of instructional technologies in teacher training Colleges in Malawi. The study found out that teachers need improvement in 8 skills in instructional technologies in the three teacher Colleges. The skills include; operate overhead project, prepare flip charts, demonstrate with flip charts, make instructional material from local resources and use computers to do class work.

The result on Table 3 showed lecturers of Agricultural Education in Colleges of Education need improvement on 20 skills in utilizing Maximum and Minimum Thermometers instructional delivery to students. The skills include; identify the instrument used to measure temperature, identify and source the type of thermometers from the market, insert each thermometer into a protective shealth with two rings and hang on the brass hooks in the screen and install the thermometers out of direct sunlight so that it reads the temperature of the air among others. This study is in agreement with that of Omeje and Asogwa (2013) on resource management skill improvement needs of women farmers in melon production for poverty reduction in Enugu, Nigeria. They found 13 skills in planning, 10 skills in pre-planting operations, 6 skills in planting operations, 7 skills in post planting and post harvesting operations, 7 skills on marketing operations and 28 skills in management of material resources. Such skills include; determine the right time for planting, test seeds for viability, dissolve appropriate fungicide in water for six hours, soak melon in the solution for 24 hours, mark space 1m between rows and 1m within rows and sow the soaked melon seeds 2-3 seeds per hole. Also Gertrude-Theresa, Francis, Vera and Alawa (2014) on their study on quality assurance and performance gap assessment of agriculture teacher in teaching yam production in Colleges of Education in Nigeria, found out that teachers needs skill improvement on 16 skills in planning and pre-planting operations, 16 skills in planting and post-planting operations and 15 skills in harvest operations. The skills include; select appropriate seedlings for planting, treat seedlings with appropriate chemicals, treat the face of the seedling with appropriate fungicide and plant yam at 1m x 1m space. Another study by Onu and Alaribe (2012) on work-skill needs of secondary school graduates in pineapple production for poverty reduction in South East Nigeria and found out 18 skills in planning and marketing of pineapple seedlings or fruits in pineapple production, 10 skills in pre-nursery operations in pineapple production, 8 skills in nursery operations and 10 skills in

plantation establishment. The skills include: source pineapple plantlets that are well developed, site main nursery on a shade area free of water logging, make nursery beds on soil rich in organic matter, fumigate soil with an equal mixture of dichloro-propane to destroy nematodes and other destructive organisms, mulch the soil with black material such as polythene film or any relevant material among others.

In Table 4, it was found from the study that lecturers of Agricultural Education in Colleges of Education need improvement on 10 skills in utilizing Sunshine Recorder for instructional delivery to students. The skill items include; show the instrument used to record sunshine, source sunshine recorder from the market, fix the card into the grooves of the metal bowl of the sunshine recorder and install the instrument on a concrete pillar in the open about 1-5m above the ground to prevent the effect of nearby trees and buildings among others. This result is in agreement with the study of Tafida, Gidado and Usman (2012) on competency needs of teachers of technical education in ICT for effective teaching in Federal Colleges of Education in North-East Nigeria. The study identified 15 skills on word processing, 13 skills on internet usage and 15 skills on power point presentation. Some of the skills are; click on the window start button to display the start menu, select all programmes, choose Microsoft word from the submenu, select file option, open existing document and modify, open a web browsing application, change the web browser home page/start page, visit any site to download any file, display a slide within a presentation that you wish to change, enter text for the first bullet point, display a design on the clip board and save the modification. Another study that supports the research was that of Okwori, Adamu and Odo (2013) on evaluation of practical skills possessed by woodwork graduates of technical colleges in Niger State, Nigeria who found 8 skills in using woodworking machine. The skills include: use drilling machine to bore hole on a wood surface, use band saw machine to make curve shapes on woo surface, use jigsaw machine to make curved shapes on wood surface, use circular saw machine to rip wood surface among others.

CONCLUSION AND RECOMMENDATION

Skills improvement needs of lecturers of agricultural education in utilization of weather instruments in Colleges of Education in North-east Nigeria are significantly important. The findings of this study revealed that lecturers of agricultural education need skill improvement in the utilization of Stevenson screen, Thermo hygrograph, Maximum and Minimum Thermometers and Sunshine Recorder. It can also be concluded that determining the skill improvement needs of lecturers of agricultural education in Colleges of Education will bring to the fore those weather instruments that lecturers' needs improvement. When their skills are improved upon will bring about the desired capabilities to utilize the weather instruments in imparting practical skills in students of agricultural education. It was therefore recommended that:

1. Lecturers of Agricultural Education should seek for ways to improve their skills in utilizing the selected weather instruments for effective teaching of students.
2. Administrators of Colleges of Education should support and approve study leave for lecturers of Agricultural Education in Colleges of Education to attend workshop, seminars and conferences on utilization of the selected weather instruments for effective teaching of students and
3. Skill Acquisition Organizations should package the findings of this study into their capacity building programmes for re-training teachers of agriculture science in secondary schools in North-east Nigeria.

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