Journal of Engineering and Applied Sciences
MEDWELL PUBLICATIONS

Assessment of Computer Networking Needs of Students of Computer Education and Industrial Technical Education for Improving Academic Performance in Nigerian Universities

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Key words: Assessment, computer networking, internet security, data mining, data communication, protocol, academic performance

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Page No.: 2464-2472
Volume: 15, Issue 11, 2020
ISSN: 1816-949x
Journal of Engineering and Applied Sciences

Abstract: In this study, we assessed computer networking needs of students of computer education and industrial technical education for improving academic performance in Nigerian Universities. Four research questions guided the study while four null hypotheses formulated were tested using t-test at 0.05 level of significance. The study adopted a descriptive survey research design and was carried out in South Eastern states of Nigeria. The participants for the study consisted of 320 computer education lecturers and students in universities in southeast Nigeria. A 41-item non structured questionnaire was used as instrument for data collection. The instrument was validated by three experts. Cronbach alpha reliability method was used to determine the internal consistency of the questionnaire items and the overall reliability coefficient index of 0.98 was obtained. Three hundred and twenty copies of the questionnaire were administered and collected back by the researchers. The data collected were analyzed using mean and standard deviation to answer research questions while analysis of variance was employed to test the null hypothesis. Result revealed that there has been increasing failure in computer networking courses and there is an urgent need to find an alternative solution by developing intelligent tutor system to aid the teaching and learning based on the specification collected in this needs of assessment study for teaching and learning of computer networking.

INTRODUCTION

Most recently, an international conference on assessment for learning in Dunedin in 2009, building on work done at two earlier conferences in the UK (2001) and the USA (2005), adopted the following definition: Assessment for Learning is part of everyday practice by students, teachers and peers that seeks, reflects upon and responds to information from dialogue, demonstration and observation in ways that enhance ongoing learning[1]. Assessment is carried out during the instructional process for the purpose of improving teaching or learning[2]. An assessment activity can help learning if it provides information that teachers and their students can use as

feedback in assessing themselves and one another and in modifying the teaching and learning activities in which they are engaged. Such assessment becomes "formative assessment" when the evidence is actually used to adapt the teaching work to meet learning needs[3]. Formative assessment refers to frequent, interactive assessments of student's progress and understanding to identify learning needs and adjust teaching appropriately[4].

Academic performance of students of computer education and industrial technical education: Factors like personal, socio-economic and other environmental variables affect academic performance of students[5]. Researchers used various classification methods in their studies to predict student's academic performance such as decision trees, classification and regression trees, logistic regression, Bayesian classification, support vector machine, neural network. Among these, decision trees gain popularity in predicting student's performance[6]. A decision tree is a tree in which each branch node represents a choice between a number of alternatives and each leaf node represents a decision. Decision tree starts with a root node on which it is for users to take actions. From this node, users split each node recursively according to decision tree learning algorithm (e.g. ID3, C4.5 etc.). The final result is a tree in which each branch represents a possible scenario of decision and its outcome. Among the decision tree algorithms C4.5 gains popularity in terms of its higher performance in Classification accuracy.

Computer networking needs of students of computer education and industrial technical education: Some of Computer education courses are known as general subjects offered by students in Nigerian universities. One of such courses is computer networking. Computer networking has potentials to benefits computer education and industrial technical education students. Computer network is a collection of autonomous computers interconnected by a single technology. Two computers are said to be interconnected if they are able to exchange information. The connection need not be via. a copper wire; fiber optics, microwaves, infrared and communication satellites can also be used. Networks come in many sizes, shapes and forms. They are usually connected together to make larger networks with the Internet being the most well-known example of a network of networks[7]. Network computer devices that originate, route and terminate the data are called network nodes. Nodes can include hosts such as personal computers, phones, servers as well as networking hardware. Two such devices can be said to be networked together when one device is able to exchange information with the other device whether or not they have a direct connection to each other. One can greatly increase channel capacity by using MIMO techniques where multiple aerials or multiple frequencies can exploit multiple paths to the receiver to achieve much higher throughput by a factor of the product of the frequency and aerial diversity at each end.

Data mining refers to techniques, tools and research designed for automatically extracting meaning from large repositories of data generated by or related to people learning activities in educational environment[6]. Data mining is a computational method of processing data which is successfully applied in many areas that aim to obtain useful knowledge from the data[8]. Data mining techniques according Osmanbegovic and Mirza[9] are used to build a model to identify new knowledge information. A number of studies addressed the analysis of educational data to get useful information that affect learning quality. Baker and Yacef[10] summarized the goals of educational data mining in to: Predicting student's future learning behavior, discovering or improving domain models, studying the effects of educational support and advancing scientific knowledge about learning and learners. The implementation of data mining methods and tools for analyzing data available at educational institutions is a relatively new stream in the data mining research[11]. Extensive literature reviews of the EDM research field are provided by Altaher and BaRukab[11], covering the research done in the area between 1995 and 2005 and by Nithya[12] for the period after 2005. Classification techniques were used for education data modeling. There is an increase in their application within the last 6 years Kabakchieva[12]. Researchers prefer to apply a single technique in their studies on student evaluations. Agaoglu[13] research in educational mining focuses on modeling student's performance instead of instructors' performance. Agathe and Kalinain discussed how to use data mining algorithms to help discovering relevant knowledge contained in databases obtained from Web-based educational systems. An attempt was made by Minaei-Bidgoli *et al*.[14] to presents an approach to classifying students in order to predict their final grade based on features extracted from logged data in an education web based system. Their method provides considerable usefulness in identifying students at risk early, especially in very large classes. Zekic-Susac *et al*.[15] created a model for predicting student's performance using neural networks and classification trees decision-making and with the analysis of factors which influence Student's success. When managing untrusted storage, the les must be encrypted in order to assure data con dentiality, e.g., Cryptographic file System. However, such cryptographic storage systems cannot generally provide ne-grained expressive access control, for example in Plutus, a le can only be encrypted using a single key. If a user wants to share the le with more than two groups, it is not clear

which key should be used for the encryption. A simple solution is to use a common key for le encryption and to encrypt this key using each user's public key as by Goh etc. Moreover, the existing cryptographic systems do not support secure binding between the name and data and as a result, the channel must be secured in order to prevent man-in-the-middle attacks.

A wireless network is a computer network that uses wireless data connections between network nodes. Examples of wireless networks include cell phone networks, Wireless Local Area Networks (WLANs), wireless sensor networks, satellite communication networks and terrestrial microwave networks[16]. Wireless networks are the most efficient and important way of communication. Different types of information can be shared by wireless devices. Meanwhile, the current wireless networks are constantly under various attacks, such as malware, virus and worm infection, Distributed Denial-of-Service (DDoS), hacking the data, email bombing and targeted attack[17]. It is essential to research the defense mechanisms technology for the security problems to make the wireless networks more ''safety''[18]. Therefore, it is required to develop efficient defense strategies to prevent these attacks arising every now and then. Some defense methods have been researched to overcome these security problems[19-21]. Generally, speaking, the current defense models to secure the wireless networks are classi ed as detection and prevention such as Intrusion Detection Systems (IDSs)[21], Intrusion Prevention Systems (IPSs)[19, 20] and authentication devised a packet traf c model to detect the attackers. Rodas *et al*.[22] mitigated the ongoing attacks by using the IPSs. Das *et al*.[23] introduced a two-factor user authentication protocol for wireless sensor network which provided authentication, key establishment.

With the evolution of the studies on these various attacks, the optimal strategy has become an important approach in current researches. Game theory has been applied for the security problems in wireless networks[24]. The game theory provides a useful mathematical tool for analyzing decision problems for multiple players and the outcome of each player in game model depends on both his decisions and other's decisions. Similarly, a game model in wireless networks depends not only on the defense strategies but also on the actions of the attackers. Bedi *et al*.[25] formulated a static game model to study the interactions between the attackers and the defenders. The research by Li and Wu[26] developed a Bayesian game to discuss the strategies of the legitimate nodes and the malicious nodes, respectively, the malicious nodes tried to get better prots by deceiving the legitimate nodes and cooperated with them. The proposed scheme minimized the impact of malicious nodes. Maintaining the stability, reliability and security of computer networks implies understanding type, volume and intrinsic features of flows comprising carried traffic. Efficient network monitoring allows the administrator to achieve a better understanding of the network[27]. In traffic analyzing and network monitoring applications, data arrives in real time from different heterogeneous sources. According to Bar *et al*. [28] such as packets captured over the network or multiple kinds of logging from systems and applications.

Statement of the problem: In Nigerian tertiary institutions, it is observed that, students pass other courses excellently but when it comes to computer networking courses, the scores are not encouraging. It observed that by contrast, a traditional environment, learning of computer network in the classroom is done through recorded notes. Presentations can also be made face-to-face. But in an intelligent tutor system learning environment, reading and writing are the main activities. A particular consideration in this setting is the quality and response time for feedback given by instructors in a traditional setting, feedback is prompt. But in an intelligent tutor system online setting, feedback can take at least 24 h. This lag time can be shortened if the instructor enables at least 4 peers to comment on an assignment. The instructor then provides feedback in the end and this way, the learner feels a greater sense of community support.

However, in traditional classroom, a person can be physically present in the classroom but mentally absent and no one would know. But in intelligent tutor system environment, especially during live discussions, each participant has to be mentally present to progress towards the learning goal of the discussion. Let alone the fact that most learners express themselves better in text form than in verbal form. The difference in this aspect lies in the capability to hold a similar discussion in an asynchronous environment. Learners and instructors log in at their convenience and add their comments (according to the commenting rubric). The instructor and peers provide feedback on their own schedule. This creates a self-paced learning environment. Hence, it is no longer about who knows the most at the current time as the problem of traditional learning method, rather who prepared the most for a given time. In a traditional classroom setting, the instructor is a dominant authority, it is imperative for researchers in education to develop a more effective way of learning computer networking for Nigerian students. Hence, it has led the researchers to find it there is need to develop an intelligent tutor system as a means of solving problems encountered in the teaching and learning of computer networking.

Purpose of the study: The general purpose of the study was to assess the computer networking needs of computer education and industrial technical education students for improving academic performance in Universities in Southeast Nigeria. Specifically, the study South to:

- Determine data communication and internet security needs of computer and industrial technical education students
- Find out wireless communication and mobile computing technology needs of computer and industrial technical education students
- Determine data mining and security issues needs of computer and industrial technical education students
- Find out data communication and protocol needs of computer and industrial technical education students

Research questions: The following research questions guided the study:

- What are the data communications and internet security needs of computer and industrial technical education students?
- What are the wireless communications and mobile computing technology needs of computer and industrial technical education students?
- What are the data mining and security issues needs of computer and industrial technical education students?
- What are the data communication and protocol needs of computer and industrial technical education students?

Hypothesis: The following null hypothesis were tested at 0.05 level of significance:

- There is no significant difference between the mean ratings of the respondents on data communication and internet security needs of computer and industrial technical education students
- There is no significant difference between the mean ratings of the respondents on wireless communications and mobile computing technology needs of computer and industrial technical education students
- There is no significant difference between the mean ratings of the respondents on data mining and security issues needs of computer and industrial technical education students
- There is no significant difference between the mean ratings of the respondents on data communication and protocol needs of computer and industrial technical education students

MATERIALS AND METHODS

Research design: This study adopted descriptive survey research design. A descriptive survey research design according to Maduabum is a design in which data are collected from a relatively large number of people or item considered to be representative of the entire group. A survey research design according to Nwogwu is a systematic means of data collection from large group of people. It is also a data collection technique in which information is gathered from individual called respondents by having them respond to questions. The reason for using a survey research design was that questionnaire was used to collect data concerning opinion, belief, attitude, motivation and behavior of the study on assessment on computer networking needs of computer education and industrial technical education students for improving academic performance in universities in South East, Nigeria.

Area of the study: The study was conducted in Nigeria. Nigeria is comprised of multiple ethnic groups and cultures; Nigeria as a country is made up of 36 states and Federal Capital Territory. Nigeria was chosen for this study because it has tertiary institutions where Computer Education programmes are offered. The dominant socio-economic activities of people in the area are farming, trading, manufacturing of goods and services and white collar jobs.

Population for the study: The population for the study was 454 which comprised 85 computer education lecturers in the Universities that offer computer education and 369 computer education and industrial technical education students. The population of the 85 computer education lecturers was distributed as follows: 12 from University of Nigeria Nsukka, 14 from Federal University of Petroleum Resources, Effurun, 14 from Ahmadu Bello University, Zaria., 12 from University of Lagos, 13 from Abubakar Tafawa Balewa University, Bauchi, 9 from Federal University of Technology, Minna and 11 from Federal University of Technology, Akure. Then, the population distributions of the computer and industrial technical education students with respect to the above institution are: 55, 74, 68, 52, 46, 32 and 42, respectively.

Sample and sampling techniques: The sample for the study consisted of 320 computer education lectures and students from seven universities in Nigeria. The sampling technique employed was stratification sampling of computer education lecturers and students with the help of departmental heads and students course representatives,

respectively. This is to ensure that the relative contribution of each stratum in the population is exactly its relative contribution in the sampled.

Instrument for data collection: The instrument used for data collection was structured questionnaire. The questionnaire was developed by the researcher with the help of course modules on computer networking. The questionnaire is divided into two sections. Part one focused on respondent bio data while the second part is divided into four sections A-D. Section A contain items statement which relates to data communication and internet security, section B contains item statement that relates to wireless communication and mobile computing technology, section C contains item statement about data mining and security issues and section D contains item statement that relates to data communication and protocol. Respondents indicated their response by ticking against-the data communication and internet security needs of students, the wireless communication and mobile computing technology needs of students, the data mining and security issues needs of students and the data communication and protocol needs of students. Items questionnaire has four-point rating scale as following.

Perceived level of important: VHI = Very High Important = 4pt, HI = Highly Important = 3pt, LI = Low Important = 2pt, VLI = Very Low Important =1 pt.

Level of performance: VHP = Very High Performance = 4pt, HP = High Performance=3pt, LP = Low Performance = 2pt, VLP = Very Low Performance = 1 pt.

Validation of the instrument: In order to ensure the face validity of the instrument, three draft copies of the instrument were given to three expert; two from the department of science and computer education, Enugu state University of science and technology, Enugu and one from the department of computer and robotic education, University of Nigeria, Nsukka. After validation, the instruments were collected from the valuators and corrections made.

Reliability of the instrument: The instrument was trial tested to determine the internal consistency of the questionnaire items by administering 20 copies of the questionnaire on lecturers and students in University of Lagos, Lagos state. The responses obtained from the administered questionnaire were analyzed using Cronbach Alpha reliability method with the help of statistical packages for social science version 22 using formula. The reliability coefficient of 0.98 was obtained. According to guidelines by Sekaran (2003), 0.9 is considered to be good. The reliability index is 0.98. The reason for using Cronbach's alpha was that the instrument used for data collection was polychotomous.

Method of data analysis: Data collected were presented in tables and analyzed using mean standard deviation, Research questions were analyzed using mean and standard deviation. Nominal values assigned to scaling items, i.e., very high important (4 pt), high important (3 pt), low important (2 pt) and very low important (1 pt) and very high performance (4 pt), high performance (3 pt), low performance (2 pt) and very low performance (1 pt) were used to determine the mean. This gives: 4+3+2+1/4 = 10/4 = 2.5.

The decision rule was that, mean scores of 2.50 and above were regarded as high while item with mean score below 2.50 were regarded as low. Testing of the null hypotheses was done using t-test at 0.05 alpha level of significant. Any hypothesis whose significance "sig (2-tailed)" level is less than or equal to the stated 0.05 level of significance, the null hypothesis was rejected but if significance "sig (2-tailed)" level is >0.05 level of significance, the null hypothesis was accepted.

RESULTS AND DISCUSSION

Data in Table 1 shows the level of importance mean and standard deviations of items on data communications and internet security needs of students (level of important) which indicates that their means ranges from 2.66-3.82 which are above benchmark mean of 2.50; these indicate that the 11 items are very important. Table 1 also shows performance mean and standard deviation on the data communications and internet security needs of students. The table shows the mean values range from 2.20-3.76; Items 1-9 show high performances while item 3, 7, 10 and 11 show low performance. This means that students could not the four items to expectation. The value for the standard deviation ranges from 0.30-0.71 which indicated that the respondents were not far from one another in their responses.

Table 1 also shows the t-test scores of computer education and industrial technical education students and computer education lecturers on the data communications and internet security needs of students. From the 11 identified items on the data communications and internet security needs of students, the analysis show that their p-value ranged from 0.44-0.67 which are all above 0.05 level of significance. Therefore, there was no significant difference between the mean ratings of the computer education, industrial technical education students and computer education lecturers on the data communications and internet security needs of students.

Table 1: Mean, standard deviation and t-test of respondents on the data communications and internet security needs of computer and Industrial technical education students

Item statement	Mean X_i	SD SD_i	Rem.	p-values	Mean X_p	SD SD_p	Rem.
1. How to trace internet traffic with network monitoring program	3.35	0.62	VHI	0.58	2.85	0.69	VHP
2. Explaining information interception and prevention with Kaspersky	3.28	0.62	VHI	0.60	3.38	0.64	VHP
3. Explaining information alteration	2.90	0.68	VHI	0.47	2.23	0.71	VLP
4. Explaining email spoofing	3.61	0.62	VHI	0.67	3.76	0.60	VHP
5. Explain Denial of Service (DOS) attack	3.63	0.62	VHI	0.62	3.04	0.67	VHP
6 Show how data jams on wireless network	2.63	0.74	VLI	0.50	3.10	0.66	VHP
7. Explaining what is hacking	3.61	0.60	VHI	0.59	2.90	0.68	VHP
8. Using of pulse connect secure 9.0 application on network	3.66	0.61	VHI	0.60	2.91	0.52	VHP
9. Using of Kaspersky for internet security	3.39	0.74	VHI	0.58	2.95	0.66	VHP
10. Identifying emerging threats and the solutions on the internet	3.82	0.59	VHI	0.57	2.46	0.30	VLP
11. How to encrypt data and cryptanalyze data	2.66	0.71	VHI	0.44	2.20	0.16	VLP

X_I = Mean Important; X_P = Mean performance; VHI/HLP = Very High Important and Very High Performance; VHI/VLP= Very High Important and Very Low Performance; VLI/VHP= Very Low Important and Very High Performance; SD_i = Standard Deviation Important; SD_P = Standard Deviation Performance; = Significant

Table 2: Mean, standard deviation and t-test of respondents on the wireless communications and mobile computing technology needs of computer and industrial technical education students

Item statements	Mean	SD X_I	Rem. SD_I	p-values	Mean Xp	SD SD_P	Rem.
1. Using structure to explain wireless network	3.13	0.85	VHI	0.46	2.91	0.53	VHP
2. Explain Ad Hoc networks	2.88	0.50	VHI	0.44	2.82	0.68	VHP
3. Identify wireless devices-router, adapter, repeater, phone, Garage door openers, baby monitor, Walkie-talkies	2.75	0.51	VHI	0.39	2.29	0.37	VLP
4. Identify personal digital assistant- laptop, tablet and phone in data communication	2.68	0.44	VHI	0.36	1.97	0.12	VLP
5. Show the LAN basic structure and the interaction of all network devices	2.94	0.50	VHI	0.44	2.83	0.50	VHP
6. Show the 802.11 architecture interaction of LAN	2.75	0.54	VHI	0.41	2.62	0.46	VHP
7. Illustrate the components of wireless LAN- radio NICs, access points, Routers, repeaters, Antennae	3.05	0.66	VHI	0.42	2.41	0.34	VLP
8. Explain wireless personal Area networks	2.57	0.41	VHI	0.36	2.17	0.44	VLP
9. Identify the components of Bluetooth and its architecture	2.55	0.32	VHI	0.38	2.45	0.41	VLP
10. Show how to secure mobile Bluetooth devices	2.51	0.35	VHI	0.38	2.45	0.28	VLP
11. Explain the Bluetooth threats to wireless handheld devices	2.66	0.40	VHI	0.38	2.34	0.26	VLP
12. Explain emerging wireless technologies- wireless fidelity,	2.65	0.47	VHI	0.37	2.13	0.28	VLP
light fidelity,gigabit wireless, Bluetooth, WIMAX, ZigBee and RFID technology	2.70	0.41	VHI	0.39	2.34	0.28	VLP
13. Explain the impact of mobile computing in e-Learning, managing database and information sharing							

X_I = Mean important; X_P = Mean performance; VHI/HLP= Very High Important and Very High Performance; VHI/VLP= Very High Important and Very Low Performance; VLI/VHP= Very Low Important and Very High Performance; SD_i = Standard Deviation Important; SD_P = Standard Deviation Performance; = Significant

Table 2 shows 13 items on the wireless communications and mobile computing technology needs of students. The Mean of each of the items on the level of importance ranged from 2.51-3.01 which are above the benchmark mean of 2.50 which shows that all the items are very important. The values for the standard deviation range from 0.32-3.85 which show that the respondents were not far from one another in their responses.

Table 2 also shows 13 items on wireless communications and mobile computing technology needs of students. Performance mean of the items on wireless communications and mobile computing technology needs of students range from 1.97-2.91 which shows low performance which indicated that the students could not perform the items. From the 13 identified items on the wireless communications and mobile computing technology needs of students, the analysis shows that their p-value ranged from 0.36-0.46 which are all above 0.05 level of significance. Therefore, there is no significant difference between the mean ratings of the students and lecturers on the wireless communications and mobile computing technology needs of students.

Table 3 shows the level of importance mean and standard deviations on the data mining and security issues needs of students. From Table 3, the mean and standard deviation values for the 8 items on the data mining and security issues needs of students range from 2.03-3.22 and 0.45-0.88, respectively which also showed very high Level of importance for all the items except item 7.

Table 3 also the performance mean and standard deviation values of the 8 items on the data mining and security issues needs of students range from 1.82-3.10 and

Table 3: Mean, standard deviation and t-test of respondents on the data mining and security issues needs of computer and industrial technical education students

Item statements	Mean X_I	SD SD_I	Rem.	p-values	Mean X_P	SD SD_P	Rem.
1. Explain data mining	3.22	0.81	VHI	0.78	3.02	0.67	VHP
2. Data mining software and how to use Datamelt in problem solving and analysis	3.22	0.81	VHI	0.68	2.19	0.40	VLP
3. How to use Datamelt software to prepare data warehouse	3.02	0.72	VHI	0.61	1.82	0.26	VLP
Illustrate the data mining operations-classes, clusters, association and sequential pattern	2.79	0.53	VHI	0.61	2.00	0.16	VLP
4. Explain level of analysis-genetic algorithm, sequential, decision tree, data visualization	2.87	0.48	VHI	0.63	2.17	0.32	VLP
5. How to secure data warehouse with password and authentication	2.95	0.58	VHI	0.61	1.97	0.3	VLP
6. Show how data intercept and loss on the network	2.03	0.5	VLI	0.64	3.1	0.74	VHP
7. Show the data security management-network layer security,							
8. IP security protocol, email security	2.62	0.45	VHI	0.70	2.94	0.76	VHP

X_I = Mean important; X_P = Mean performance; VHI/HLP = Very High Important and Very High Performance; VHI/VLP= Very High Important and Very Low Performance; VLI/VHP= Very Low Important and Very High Performance; SD_I= Standard Deviation Important; SD_P= Standard Deviation Performance; = Significant

Table 4: Mean, standard deviation and t-test of respondents on the data communication and protocol needs of students

Item statements	Mean X_I	SD SD_I	Rem.	p-values	Mean X_P	SD SD_P	Rem.
1. Explain the basic components of communication network	3.25	0.91	VHI	0.63	2.45	0.59	VLP
2. Show LAN, WAN, WLAN, MAN, SAN, PAN with diagrams and explanations	3.4	1.01	VHI	0.62	2.25	0.56	VLP
3. Illustrate how multipoint server interacts with stations.	3.1	0.86	VHI	0.58	2.15	0.68	VLP
4. Use diagram to show and explain point to point protocol	2.85	0.75	VHI	0.56	2.2	0.37	VLP
5. How to implement OSI Model	2.95	0.56	VHI	0.66	3.05	0.77	VHP
6. Explain the recommendation of CCITT	2.26	0.49	VLI	0.51	2.35	0.49	VLP
7. Show how packet switching works on computer network	2.45	0.59	VLI	0.50	2.10	0.35	VLP
8. Explain how to secure network	2.0	0.37	VLI	0.48	2.36	0.46	VLP
9. How to use OSI model to troubleshoot networks	2.35	0.77	VLI	0.55	2.65	0.52	VHP

Key: X_I = Mean Important; X_P = Mean Performance; VHI/HLP= Very High Important and Very High Performance; VHI/VLP= Very High Important and Very Low Performance; VLI/VHP= Very Low Important and Very High Performance; SD_I = Standard Deviation Important; SD_P = Standard Deviation Performance; = Significant

0.26-0.76, respectively which shows high performance in items 1, 7 and 8. But items 2-6 showed low performance because they are below the benchmark mean of 2.50. this result indicates that the students could not perform the items to expectation. The result on standard deviation shows that the respondents were not far from one another in their responses and their responses were not far from the mean.

Table 3 also shows the scores of computer education lecturers and students on the data mining and security issues needs of students. From the 8 identified items on the data mining and security issues needs of students, the analysis shows that their p-value ranged from 0.61-0.78 which are all above 0.05 level of significance. Therefore, there is no significant difference between the mean ratings of the computer education lecturers, computer education students and industrial technical education students on the data mining and security issues needs of students.

Table 4 shows the level of importance mean and standard deviations on the data communication and protocol needs of students. The table shows the level of importance mean and standard deviation values for the 9 items on the data mining and security issues needs of students range from 2.00-3.40 which show very high importance for item 1-5 except 6-9 that have low importance means. The standard deviation value for the 9 items ranges from 0.37-1.01 which shows that the respondents were not far from one another in their responses and that their responses were not far from the mean.

The table shows the level of performance mean and standard deviations on the data communication and protocol needs of students. The table 4 shows that the Mean and Standard Deviation values for the 9 items on the data communication and protocol needs of students range from 2.1-3.05 and 0.3-0.77, respectively which indicated low performance in all items except items 5 and 9. This means that the students could not perform the nine items to expectation. The standard deviation showed that the respondents were not far from one another in their responses and that their responses were not far from the mean. Table 4 showed the t-test scores of computer education lecturers, computer education students and industrial technical education students on the data communication and protocol needs of students. From the 9 identified items on the data communication and protocol needs of students, the analysis showed that their p-value ranged from 0.48-0.66 which are all above 0.05 level of

significance. Therefore, there is no significant difference between the mean ratings of the computer education lecturers and students on the data communication and protocol needs of students.

Discussion of findings: The findings are discussed under the following: the data, communication and internet security needs of computer and industrial technical education computer and industrial technical education students, the wireless communication and mobile computing technology needs of computer and industrial technical education students, the data mining and security issues needs of computer and industrial technical education students and the data communication and protocol needs of computer and industrial technical education computer and industrial technical education students. It was found that there is a need to develop intelligent tutor software that will stimulate students learning initiative and creativity, learn and increase their abilities as well as academic skills: The wireless communication and mobile computing technology needs of students. On the aspect of wireless communication and mobile computing technology needs of students It was found that virtual worlds immerse students in a flexible learning environment promoting imagination, creativity, narration, thinking at different level of abstraction. And the same time applicable to the data mining and security issues and the data communication and protocol.

CONCLUSION

Based on the findings of this study, it reveals that there has been increasing failure in computer networking courses and there is an urgent need to find an alternative solution by developing intelligent tutor software to aid the teaching and learning based on the specification collected in this needs of assessment for teaching and learning of computer networking. Findings of the study indicate that student's fails computer networking and with the development of tutor software, learning will be fun, flexible and easy to understand.

RECOMMENDATIONS

Based on the findings made and conclusions drawn from the study, the following recommendations were made. Government should encourage the computer education lecturers to design a tutor system that will make learning fun, simple and flexible administrators and managements of private and government Universities should be help in funding, training and retraining of their staff on the pedagogical innovations. Government should ensure restructuring, development and reinforcement of the Nigeria policy for integration of intelligent tutor systems in the Nigeria education system.

ACKNOWLEDGEMENTS

Special gratitude goes to the Management of the University of Nigeria, Nsukka. The researchers appreciate the effort of lectures that helped for the success of this study and all the research assistants.

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