A novel secure system for E-Learning: Schools in MOE in Jordan Case Study

Shadi R. Masadeh [#1], Jamal Zraqou [#2], Mohammad Wadi [#3]

[#1, 2] *Faculty of Information Technology*
[#1, 2] *Isra University- Amman, Jordan*
[#3] *Free Researcher*

[#1] shadi.almasadeh@iu.edu.jo

[#2] jamal_sam@iu.edu.jo

[#3] wadi.mohmd@gmail.com

Abstract— The main target of e-learning system is to take advantage of all the possibilities offered by information technology and is to improve the security of various government institutions so as to include all the contents of e-learning, content provides a service to provide all basic services and business services, content of communicative link provides the citizen and the state agencies together all the time and provides content security for all workers on this network to work security and access to information in a safe and guaranteed.

The main goal of this research is to create a novel security system (encrypting /decrypting system) that will enable E-learning to exchange data more securely.

Keywords— E-content, E-protection, Encryption and Decryption, Security of E-content.

INTRODUCTION

Many schools in MOE in Jordan have to use wireless networks to provide their academic staff as well as students with wireless access to facilitate nomadic access to school systems and internet. But all that is broadcast over the air, so any eavesdropper, with proper equipment can have the access to the information that is transmitted over the air.

These Wireless Networks needed to be secured in order to protect the information they transmit over the air between the users and access points, so the designers worked a light weight securing system they called WEP (Wired Equivalent Privacy). An example as a current use of wireless networks in educational institutions is the schools in MOE. Many schools in MOE in Jordan have an e-learning network sponsored by the Queen Rania Centre (QRC), to provide classrooms with a new learning approach that could be developed at later stages to provide a portal for Teachers to access instructional and examinational materials.

The Queen Rania Centre (QRC) is utilizing a wireless network that connects to some classrooms as a pilot project to fathom the efficiency of the project. This imposes security vulnerability in that the network is using conventional wireless protection schemes (WEP, WPA, and WPA-PSK).

The main objective of this research is to introduce a novel encryption/decryption system that, in addition to the well known systems, will make it hard for the code crackers to get the data. This system was implemented and tested in schools in MOE in Jordan.

This paper is organized as follows: Related work is described in Section 2. Section 3 describes the proposed secure E-learning system. Finally conclusions are drawn to section 4.

RELATED WORKS

Many researchers have presented the security issues and weaknesses of e-learning system from different points of view, E. Kritzinger and etal [6] explained the security issues of e-learning schema, they recommended using the four pillars that should be put in place to improve the overall security. These pillars are: ensuring e-learning security, introducing e-learning security policies and procedures, implementation of e-learning Security countermeasures and monitoring the e-learning Security countermeasures.
A. Jalal and etal [7] presented the security feature of e-learning authentication they recommended to use web application for security; they use SKiP method to provide same features of SSL. And they recommended using RIPEMD-160 hash function, to provide security and authentication.

Najwa Hayaati and etal [8] described that information security management is essential to ensure the security of the e-learning environment, the combination of ISM and the information security technology can provide better secure implementation of e-learning system that will provide better results in the success of security implementation.

Farhan Obisat and etal [9] investigated the factors that influence the adoption of e-learning systems in Jordan, as well as surveying the fact which has not been tested yet in the study domain literature.

Shadi R Masadeh and etal [19] suggested in their paper a new model to secure e-content in Elearning system in order to enhance mobile access to educational systems for students and teachers.

THE PROPOSED SECURE E-LEARNING SYSTEM

The wireless network provides the academic staff, employees and, students with a remote access to: The school students database files, Internet and Online E-Learning courses.

The main security issues that must be assured are the Confidentiality, Integrity, and Availability of the system data and resources. Therefore, the new security system must satisfy the following factors:

- Increase the productivity and efficiency and effectiveness of educational institutions.
- Save time and effort in the movement and wait.
- Reduce the cost to the students and the schools.
- Reduce administrative complexity and boring routine administrative processes and services in completing the transaction
- Provide privacy for the students and the schools at the same time
- Keeping transactions and access to faster and from any educational institution wants student.
- Provides content security for all workers on this network to work security and access to information in a safe and secure
- Staff training on the use of technology and employment in the institutional and government.
- Checking that the e-learning application environment for any sever-level vulnerabilities

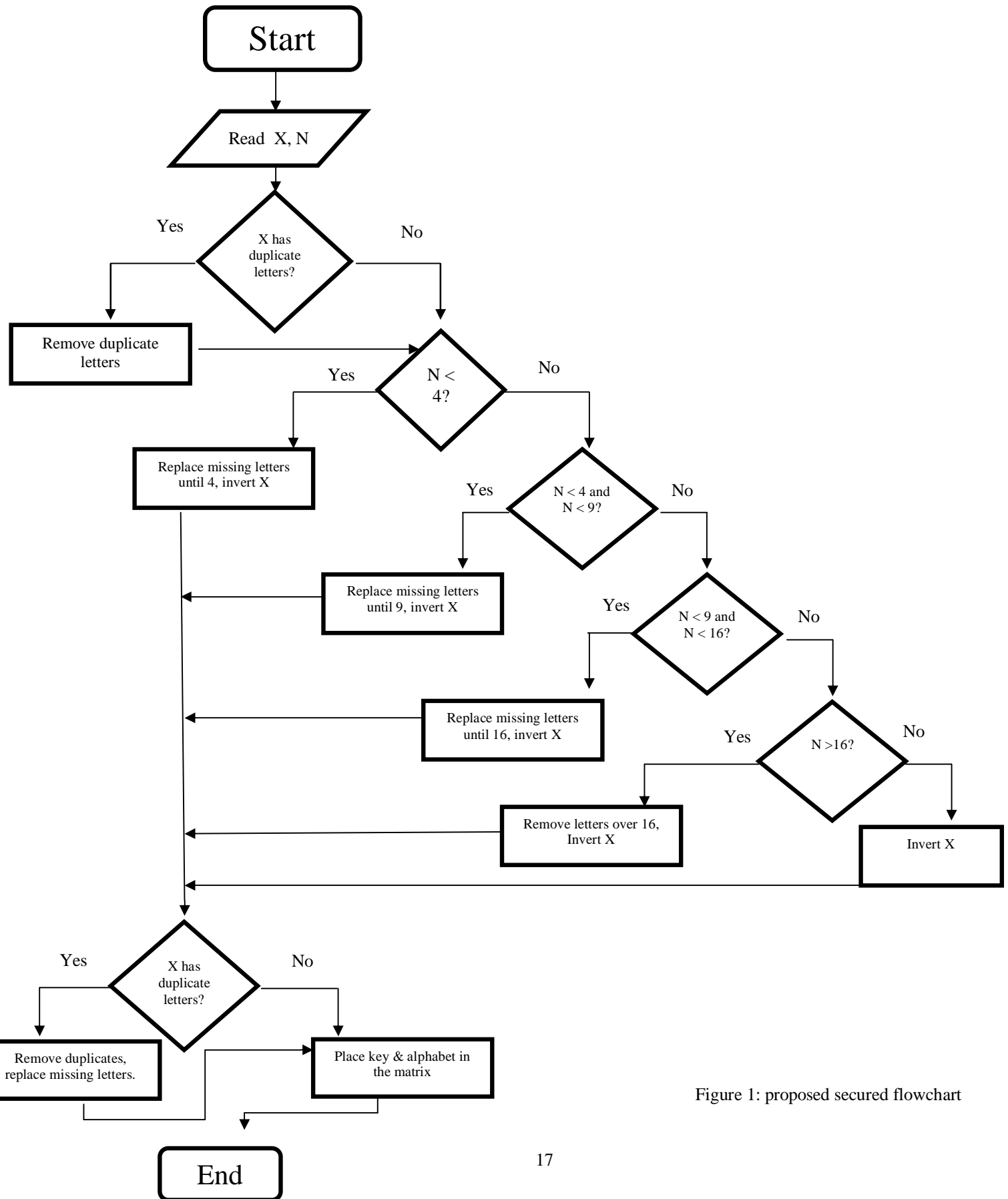The proposed system illustrated in the flowchart shown in Figure 1.

Figure 1: proposed secured flowchart

The proposed system demonstration is shown below:

a) Read the **Text** file that's intended for encryption and check for any duplicate letters.
b) In case of any duplicate letters, remove them to have a fully distinctive string.
c) Now, make sure that the string size is **4**, **9**, or **16**.
d) To achieve step **C**, you will need to add letters to the string in order to achieve a square number, e.g.: if you have a string of 7 letters, you will add 2 more letters by applying the following:

- Letter **8** equals the sum of each letter's location that precedes it in the alphabet plus **8** MOD **26**, we will get a number, we will match this number to its location in the alphabet to get letter **8**, and same step goes for letter **9**.

  *In case the string was above **16**, it will be decreased to **16** by removing the right most bits.

e) Once step **C** is achieved successfully, you will now invert the key (ABC becomes CBA), afterwards, you will check for any duplicate letters again and remove them.
f) Now you have the key ready for placing in a 5x5 matrix as follows:

- Look at the lower-right corner of the matrix, and take a matrix size which corresponds with key size (3x3 here).
- Now, order the key's letters in the matrix you have taken sequentially like shown below.
- Yet there are the missing letters which you need in order to get the complete alphabet letters, order them sequentially in the remaining matrix's intensities by the order shown Table 1 below.

Note that the letters **I** and **J** are placed in the same intensity.

¹12	²13	³14	⁴15	⁵16
⁶11	⁷4	⁸5	⁹6	¹⁰7
¹¹10	¹²3	¹³1	¹⁴2	¹⁵3
¹⁶9	¹⁷2	¹⁸4	¹⁹5	²⁰6
²¹8	²²1	²³7	²⁴8	²⁵9

Table 1: Matrix of proposed method

CONCLUSIONS

E-learning includes text, video, audio, animation and virtual environments. E-learning can incorporate many elements that make learning more interesting.

The expected outcome from proposed secure e-learning system is to give teachers and students ability to gain secure mobile access course materials and administrative tools, enabling the teaching staff to perform administrative functions from any location, manage coursework and collaborate more efficiently with colleagues, To distribute coursework in a conventional manner or to provide online access to course materials, and access to critical information via wireless networks.

The secure e-learning system proposed in this paper accommodates the latest security technologies that help to enhance the security level of the e-learning content and education process.

REFERENCES

[1] Cooper (1999). "Anatomy of an On-Line Course"T.H.E.Journal, 26, 49.Retrieved May 25, 1999 from INFOTRAC, SearchBank (Article# A53929573). http://en.wikipedia.org/wiki/Pretty_Good_Privacy
[2] IEEE802.11i , URL:http://standards.ieee.org/getieee802/download/802.11i-2004 .pdf
[3] http://web.cs.dal.ca/~tt/ECMM6010/presentations/PGP.pdf
[4] http://www.sans.org/reading_room/whitepapers/vpns/openvpn-ssl-vpn-revolution_1459
[5] Wi-Fi Alliance. "Securing Wi-Fi Wireless Networks with today technologies",
[6] E. Kritzinger, S.H von Solms ,(2006) "E-learning: Incorporating Information Security Governance", http://www.informingscience.org/ proceedings/ InSITE2006/ IISITKrit157 .pdf
[7] A. Jalal and Mian Ahmad Zeb,(2008) "Security Enhancement for E-Learning Portal"IJCSNS International Journal of Computer Science and Network Security, VOL.8 No.3.
[8] Najwa Hayaati Mohd Alwi, Ip-Shing Fan,(2010)" E-Learning and Information Security Management" International Journal of Digital Society (IJDS), Volume 1, Issue 2.
[9] Dr Farhan M Obisat Dr.Ghalib saleh saraireh, (2010) "factors affecting the e-learning in the middle east: jordan school case study" www.irrodl.org/index.php/irrodl/article/ download/ 596/1232
[10] S. Landau, (2000)" Data Encryption Standard (DES)" .Notices of the AMS.
[11] Jenne Wong,(2003) "Performance Investigation of Secure 802.11 Wireless LANS: Raising the security Bar to Which Level?", URL: http://www.cosc.canterbury.ac.nz/ research/reports/ MastTheses/2003/ mast_0301.pdf
[12] McCrea, F., Gay, R. K., & Bacon, R. (2000). Riding the big waves: A white paper on B2B e-learning industry. San Francisco: Thomas Weisel Partners LLC.
[13] Urdan, T. A., & Weggen C. C. (2000). Corporate e-learning: Exploring a new frontier. WR Hambrecht + Co
[14] Tim L. Wentling; Consuelo Waight; James Gallaher; Jason La Fleur; Christine Wang; Alaina Kanfer, (2000)" E-learning - A Review of

[15] Literature ", Knowledge and Learning Systems Group, University of Illinois at Urbana-Champaign .

[16] Cooper (1999). "Anatomy of an On-Line Course"T.H.E.Journal, 26, 49.Retrieved May 25, 1999 from INFOTRAC, SearchBank (Article# A53929573).

[17] Howell, S.L. (2003)."E-Learning and Paper Testing: Why the Gap?" Educause Quarterly.Number 4.

[18] Ashwin, A. (2005), "E-Learning in Business and Economics" , in Teaching Business Education 14-19,Jephcote, M.& Abbott, l.(eds),David Fulton.

[19] Shadi R Masadeh, Nedal Turab, Farhan Obisat, 2012. A secure model for building e-learning systems. Network Security, Volume 2012, Issue 1, January 2012, Pages 17-20.