

An Intelligent Tutoring System for Teaching English Grammar

Mahmoud Abu Ghali¹, Abdullah Abu Ayyad¹, Samy S Abu-Naser¹, Mousa Abu Laban²

¹Department of Information Systems,
Faculty of Engineering and information technology,
Al-Azhar University, Gaza

²Faculty of Education, Islamic university, Gaza

Abstract: Education sector in the world takes the largest part from the other sectors, because of this; all countries are interested in the field of education. If we look at learning English language is the third most common languages in the world. Also, IS the internationally dominant in the telecommunications, science and radio, aviation, entertainment, read and diplomatic language as most of the areas of work now taught in English. In this paper, we describe an intelligent tutoring system to help students to help students learn English language grammar easily and smoothly. Therefore, AI experts developed tools for improve learning ways under the name Intelligent Tutoring System. The Intelligent Tutoring System (ITS) is a computer system that offers an instant, adapted instruction and customized feedback to students without human teacher interference. System adapts with all the individual differences of students and begins gradually with students from easier to harder level. The intelligent tutoring system was given to a group of students all age groups to try it and to see the impact of the system on students.

Keywords: Intelligent Tutoring System, Authoring Tool, ITSB, Expert system, English Grammars, Education

1. INTRODUCTION

1.1 Authoring System

A program that help in creating more than ITS with relatively easy way and provide the experience of crating ITS without the need of expert programmer to made it.

1.2 Our Intelligent Tutoring System

This Intelligent Tutoring System was constructed using ITSB language which stands for Intelligent Tutoring System Builder [1]. It is a two-languages supported system (English and Arabic) and easy to manage through their student UI and the Teacher UI screens. The ITSB implemented in Delphi Embarcadero RAD Studio XE8 [1]. ITSB is easy for the domain expert to build the ITS system and for the end users when they use it, without any requirement of programming of use.

The system helps students to learn Structures after Hope and Wish, the conjunctions (as long as – provided "that" – unless), the obligations (must – don't have to – had to), would rather and Prefer grammars. During the process the intelligent tutoring system gives assistance and feedback of many types in an intelligent manner according to the behavior of the student. An evaluation of the intelligent tutoring system has revealed reasonably acceptable results in terms of its usability and learning abilities are concerned.

2. LITERATURE REVIEW

In recent years, we have a huge development of Intelligent Tutoring System, ITS has attracted much attention of the researchers. There are many intelligent tutoring systems, such as ITS teach students English dialogues through interaction with students and it takes into account

the individual differences of students through levels [3]. PIXIE Design by Sleeman in 1987 is based on Leeds Modeling System (LMS) to examine errors in algebra [4]. MYCIN [5] is expert system for diagnosing diseases such as cancers, based on MYCIN, Designed GUIDON to display the lessons of the disease and symptoms, showing rules in the knowledge base of the student [6]. A comparative study between Animated Intelligent Tutoring Systems (AITS) and Video-based Intelligent Tutoring Systems (VITS) [7], Affective tutoring systems (ATS) based on embedded devices is a system that relies on embedded devices for detecting the feelings, emotion, psychology student and also adapt to the student's mood such as angry, frustrated and fatigued etc. Based on the mood and feelings of the student, the student will learn [8, 9], teaching AI searching algorithms [10], teaching database to sophomore students in Gaza [11], Predicting learners performance using NT and ITS [12], learning to program in C++ [13], and security[44-54].

3. ITS ARCHITECTURE

We used the Intelligent Tutoring System Builder (ITSB) tool in building intelligent tutoring system for learning grammar English tenses. ITSB authoring tool is developed using Delphi Embarcadero XE8, 2015; ITSB authoring tool consists of two systems. The former is the teacher is a system through which add materials and questions and answers etc. and the latter is the students a system through which learn the course material and answer the exercises [14].

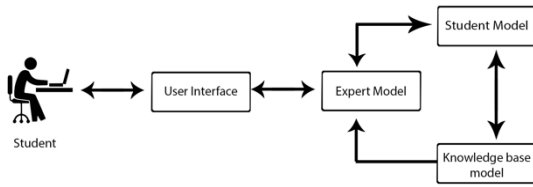


Figure 1 : Architecture of the Intelligent Tutoring System.

3.1. Domain model (knowledge base model)

This model is named domain model and it is synonymous with the domain model of other architectures. The model presents the materials and the teachings in a simple and it creates a lot of problems for each lesson taking into account, the individual differences. When a student responds to the problem, determines whether good or bad, as well as it evaluate the student. This model deals with many important topics of interest in the System for English grammar. The topics covered in intelligent tutoring system are:

- Structures after Hope and Wish
- The conjunctions: as long as – provided "that" – unless
- The obligations: (must – don't have to – had to)
- Would rather and Prefer

3.2. Student model

The admin (teacher) of ITS must create student account before a student can use the system, the student account including student's information such as name, number, login date, score and level of difficulty.

3.3. Expert model

The learning martial have several levels which inserted by teacher. Each level has a part of the lessons and have a question at the end of level. Each level question contains an assessment and special criteria for progression to the next level. e.g. "in question at level one student score must get above 59% to pass in this level to move to the next level 'level two', but if get less than 60% must repeats to the questions at the same level"

3.4. User interface model

The ITSB tool used for building the current ITS system has an interface that supports two classes of users: teachers and students. When the teacher's log into the system, the teacher can add/modify lessons, exercises, answers, initial information about the student, configure/adjust the color, font name, and size of all buttons, menus, and combo boxes. Therefore, this interface provides the system with the required heftiness and suppleness. A screenshot of the teacher's interface is shown in, Fig 2 to Fig 8.

But when the student logs into the system, he/she can study the lessons, examples, solve the exercises for each lesson. A screenshot of the student's interface can be seen in Fig 9 to

Fig 14.

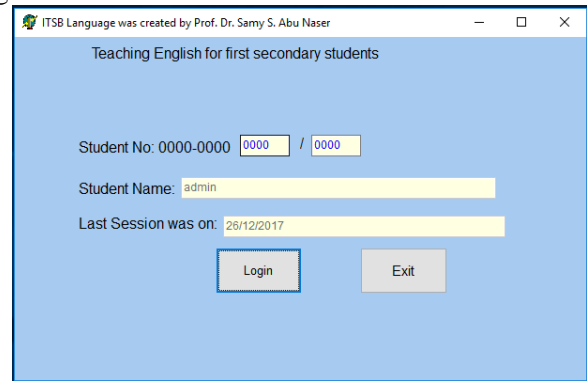


Figure 2: Login Screen

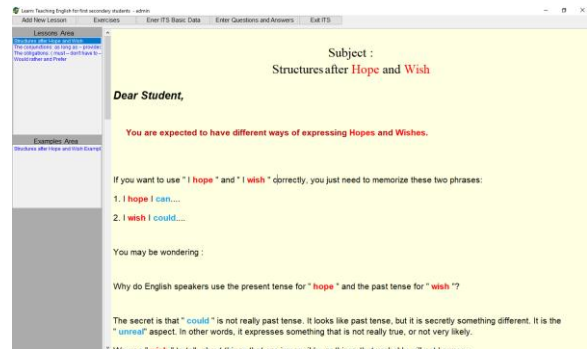


Figure 3: Lessons Area

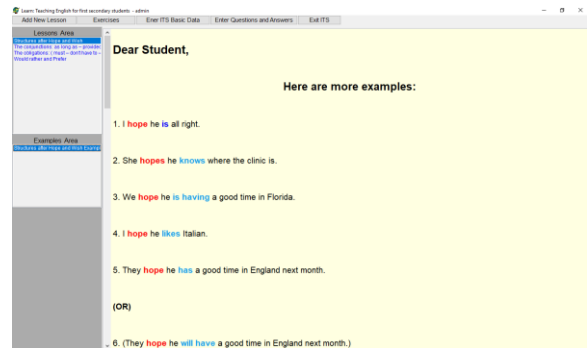


Figure 4 : Examples Area

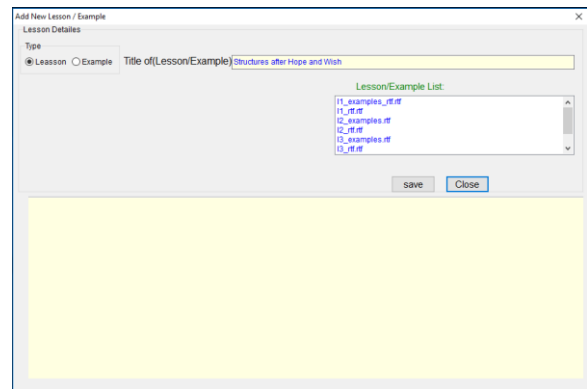


Figure 5: Add Lesson/Example Screen

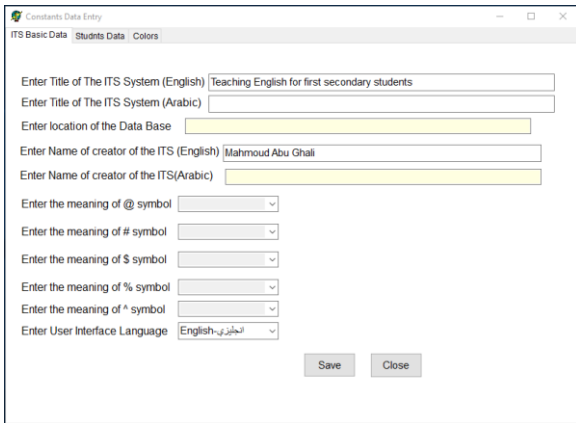


Figure 6: Add basic ITS data

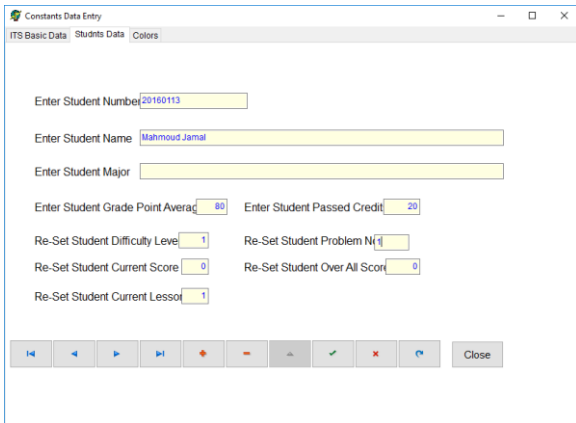


Figure 7: Add Students to System

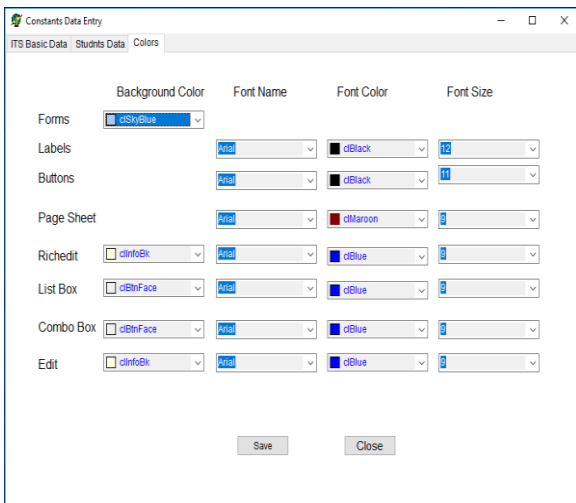


Figure 8 : Choose the font, color, sizes for other screens

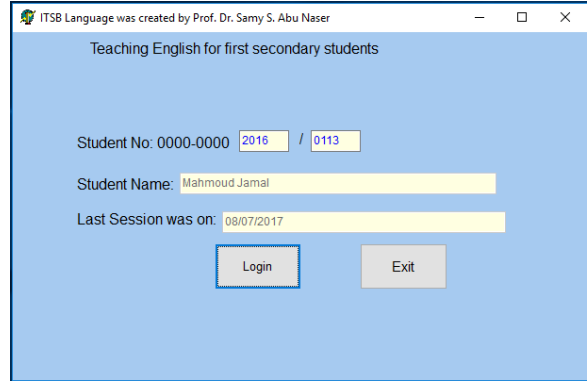


Figure 9: Student login screen

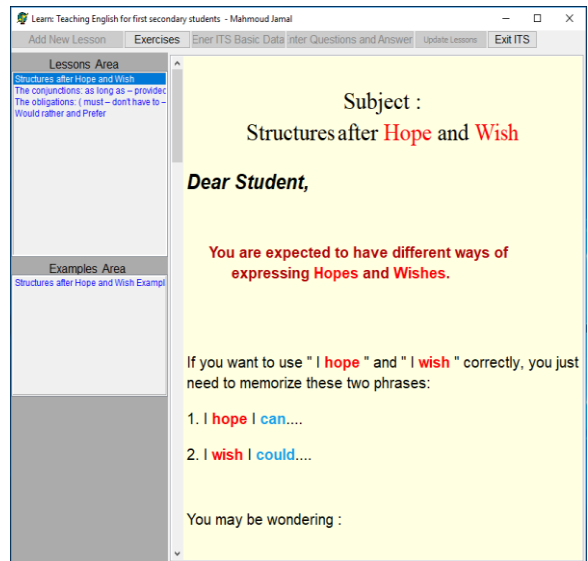


Figure 10: Student Main screen (Lessons)

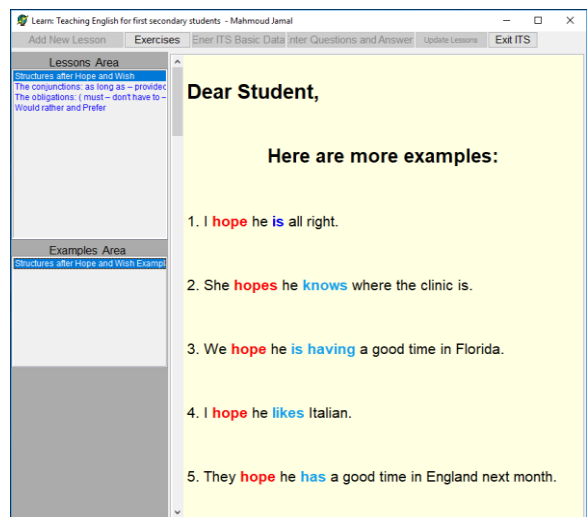


Figure 11: Student login screen (Examples)

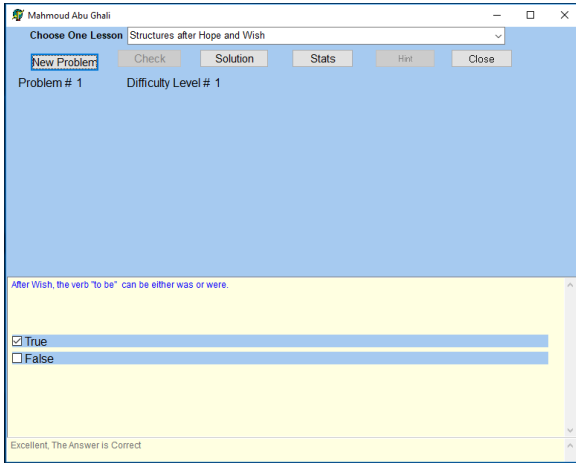


Figure 12: Question screen (if answer is correct)

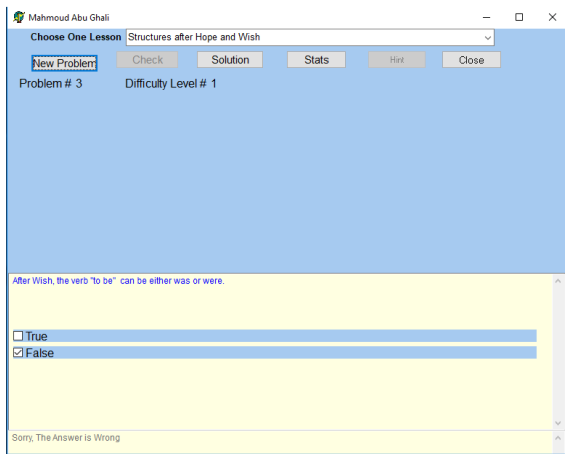


Figure 13: Question screen (if answer is incorrect)

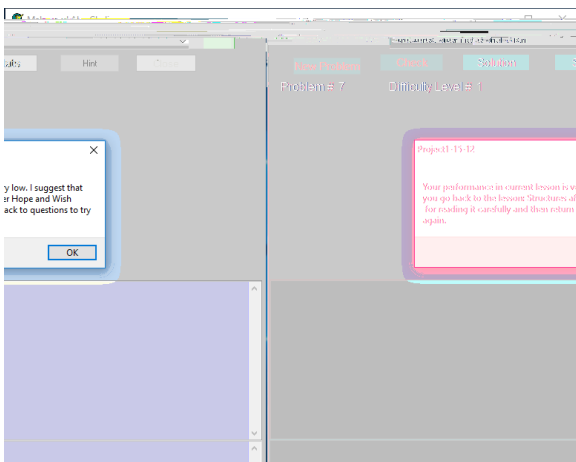
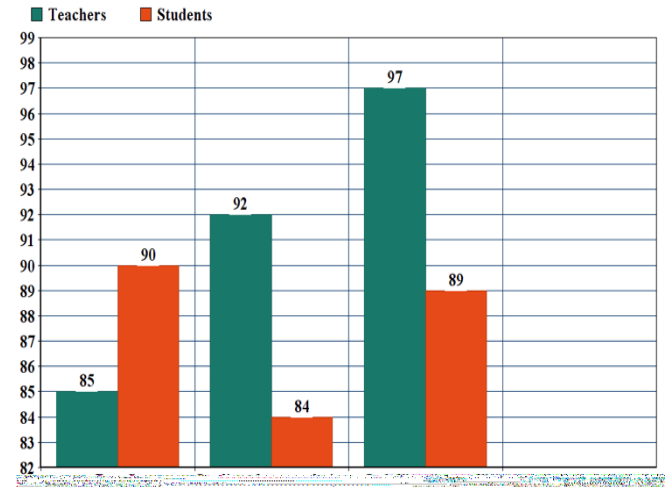


Figure 14: student performance status

4. EVALUATION

We evaluated the Intelligent Tutoring System for English Grammar by presenting the system on a group of teachers who specialize in teaching English language and a group of students at the high school and university. Then we introduced a number of questions for each teacher and each student in terms of benefit, comprehensiveness of material, quality of system design and quality of material. The result of the evaluation by teachers and students are pleasing as shown in Fig 9.

Figure 9 : The result



Results of the evaluation.

5. CONCLUSION

In the future, we will suggest an intelligent system to teaching the skills of listening, spelling, writing and conversation in the English language.

We have designed an intelligent tutoring system for English grammar using ITSB tool. The system is designed to facilitate the study of English grammar to students and overcome the difficulties they face with ease and smoothness. System architecture and requirements of each part in the system has been explained.

REFERENCES

1. Abu Naser, S. S. (2016). ITSB: An Intelligent Tutoring System Authoring Tool. Journal of Scientific and Engineering Research, 3(5), 63-71.
2. Abu Ghali, M. J., Mukhaimer, M. N., Abu Yousef, M. K., & Abu Naser, S. S. (2017). Expert System for Problems of Teeth and Gums. International Journal of Engineering and Information Systems (IJEIS), 1(4), 198-206.
3. Mrouf, A., Albatish, I., Mosa, M., & Abu Naser, S. S. (2017). Knowledge Based System for Long-term Abdominal Pain (Stomach Pain) Diagnosis and

- Treatment. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4), 71-88.
4. Qwaider, S. R., & Abu Naser, S. S. (2017). Expert System for Diagnosing Ankle Diseases. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4), 89-101.
 5. AbuEl-Reesh, J. Y., & Abu Naser, S. S. (2017). An Expert System for Diagnosing Shortness of Breath in Infants and Children. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4), 102-115.
 6. Al Rekhawi, H. A., Ayyad, A. A., & Abu Naser, S. S. (2017). Rickets Expert System Diagnoses and Treatment. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4), 149-159.
 7. Almurshidi, S. H., & Abu Naser, S. S. (2017). Design and Development of Diabetes Intelligent Tutoring System. *EUROPEAN ACADEMIC RESEARCH*, 6(9), 8117-8128.
 8. Al-Bayed, M. H., & Abu Naser, S. S. (2017). An intelligent tutoring system for health problems related to addiction of video game playing. *International Journal of Advanced Scientific Research*, 2(1), 4-10.
 9. Hamed, M. A., & Abu Naser, S. S. (2017). An intelligent tutoring system for teaching the 7 characteristics for living things. *International Journal of Advanced Research and Development*, 2(1), 31-45.
 10. Almurshidi, S. H., & Abu Naser, S. S. (2017). Stomach disease intelligent tutoring system. *International Journal of Advanced Research and Development*, 2(1), 26-30.
 11. El Agha, M., Jarghon, A., & Abu Naser, S. S. (2017). Polymyalgia Rheumatic Expert System. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4), 125-137.
 12. Khella, R. A., & Abu Naser, S. S. (2017). Expert System for Chest Pain in Infants and Children. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4), 138-148.
 13. Akkila, A. N., & Abu Naser, S. S. (2017). Teaching the right letter pronunciation in reciting the holy Quran using intelligent tutoring system. *International Journal of Advanced Research and Development*, 2(1), 64-68.
 14. AbuEloun, N. N., & Abu Naser, S. S. (2017). Mathematics intelligent tutoring system. *International Journal of Advanced Scientific Research*, 2(1), 11-16.
 15. Bakeer, H. M. S., & Naser, S. S. A. (2017). Photo Copier Maintenance Expert System V. 01 Using SL5 Object Language. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4), 116-124.
 16. Nabahin, A., Abou Eloun, A., & Abu Naser, S. S. (2017). Expert System for Hair Loss Diagnosis and Treatment. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4), 160-169.
 17. Al-Nakhal, M. A., & Abu Naser, S. S. (2017). Adaptive Intelligent Tutoring System for learning Computer Theory. *EUROPEAN ACADEMIC RESEARCH*, 6(10), 8770-8782.
 18. Abu Hasanein, H. A., & Abu Naser, S. S. (2017). An intelligent tutoring system for cloud computing. *International Journal of Academic Research and Development*, 2(1), 76-80.
 19. Alhabbash, M. I., Mahdi, A. O., & Abu Naser, S. S. (2016). An Intelligent Tutoring System for Teaching Grammar English Tenses. *EUROPEAN ACADEMIC RESEARCH*, 6(9), 7743-7757.
 20. Alawar, M. W., & Abu Naser, S. S. (2017). CSS-Tutor: An intelligent tutoring system for CSS and HTML. *International Journal of Academic Research and Development*, 2(1), 94-98.
 21. Al-Bastami, B. G., & Abu Naser, S. S. (2017). Design and Development of an Intelligent Tutoring System for C# Language. *EUROPEAN ACADEMIC RESEARCH*, 6(10), 87-95.
 22. Hilles, M. M., & Abu Naser, S. S. (2017). Knowledge-based Intelligent Tutoring System for Teaching Mongo Database. *EUROPEAN ACADEMIC RESEARCH*, 6(10), 8783-8794.
 23. Al-Hanjori, M. M., Shaath, M. Z., & Abu Naser, S. S. (2017). Learning computer networks using intelligent tutoring system. *International Journal of Advanced Research and Development*(2), 1.
 24. Aldahdooh, R., & Abu Naser, S. S. (2017). Development and Evaluation of the Oracle Intelligent Tutoring System (OITS). *EUROPEAN ACADEMIC RESEARCH*, 6(10), 8711-8721.
 25. Elnajjar, A. E. A., & Abu Naser, S. S. (2017). DES-Tutor: An Intelligent Tutoring System for Teaching DES Information Security Algorithm. *International Journal of Advanced Research and Development*, 2(1), 69-73.
 26. Shaath, M. Z., Al-Hanjouri, M., Abu Naser, S. S., & Aldahdooh, R. (2017). Photoshop (CS6) intelligent tutoring system. *International Journal of Academic Research and Development*, 2(1), 81-87.
 27. Naser, S. (2009). Evaluating the effectiveness of the CPP-Tutor an intelligent tutoring system for students learning to program in C++. *Journal of Applied Sciences Research*, 5(1), 109-114.
 28. Mahdi, A. O., Alhabbash, M. I., & Abu Naser, S. S. (2016). An intelligent tutoring system for teaching advanced topics in information security. *World Wide Journal of Multidisciplinary Research and Development*, 2(12), 1-9.
 29. Abu Naser, S. (2008). An Agent Based Intelligent Tutoring System For Parameter Passing In Java Programming. *Journal of Theoretical & Applied Information Technology*, 4(7).
 30. Abu Naser, S. (2008). JEE-Tutor: An Intelligent Tutoring System for Java Expression Evaluation.
-

- Information Technology Journal, Scialert, 7(3), 528-532.
31. Abu Naser, S. S. (2001). A comparative study between animated intelligent tutoring systems AITS and video-based intelligent tutoring systems VITS. *Al-Aqsa Univ. J*, 5(1), 72-96.
 32. Abu Naser, S. S. (2006). Intelligent tutoring system for teaching database to sophomore students in Gaza and its effect on their performance. *Information Technology Journal*, 5(5), 916-922.
 33. Abu Naser, S. S. (2008). Developing an intelligent tutoring system for students learning to program in C++. *Information Technology Journal*, 7(7), 1055-1060.
 34. Abu Naser, S. S. (2008). Developing visualization tool for teaching AI searching algorithms. *Information Technology Journal, Scialert*, 7(2), 350-355.
 35. Abu Naser, S. S. (2012). Predicting learners performance using artificial neural networks in linear programming intelligent tutoring system. *International Journal of Artificial Intelligence & Applications*, 3(2), 65.
 36. Abu Naser, S. S. (2012). A Qualitative Study of LP-ITS: Linear Programming Intelligent Tutoring System. *International Journal of Computer Science & Information Technology*, 4(1), 209.
 37. <https://www.embarcadero.com/products/rad-studio> Accessed 12 January, 2017.
 38. Johnson, W. L, Soloway, E. M.(1984). PROUST: Knowledge-based program debugging. Proc: The 7th International Software Engineering. Conference, Orlando, Florida, pp. 369-380.
 39. Sleeman, D. H. (987). PIXIE: a shell for developing intelligent tutoring systems, AI & education: Learning environments and intelligent tutoring systems, pp. 239-265.
 40. Shortliffe, E. H. (1976). Computer based medical consultations, MYCIN.
 41. William J. Clancey. (1979). Dialogue Management for Rule-Based Tutorials, Proc: International Joint Conference on AI, pp 155-161.
 42. Picard, R. W. (1997). *Affective Computing*, MIT Press.
 43. Sarrafzadeh, A.(2008). How do you know that I don't understand? A look at the future of intelligent tutoring systems, *Computers in Human Behavior*, Vol 24, no 4, pp 1342-1363.
 44. Mahmoud, Ahmed Y and Chefranov, Alexander G. (2009). Hill cipher modification based on eigenvalues hcm-EE, Proceedings of the 2nd international conference on Security of information and networks ACM, pp. 164-167
 45. Ahmed, Y Mahmoud and Chefranov, Alexander. (2011). Hill cipher modification based on pseudo-random eigen values HCM-PRE, *journal of Applied Mathematics and Information Sciences (SCI-E)*, vol (8:2), pp. 505-516
 46. Mahmoud, Ahmed Y and Chefranov, Alexander G. (2010). Secure Hill cipher modifications and key exchange protocol, *Automation Quality and Testing Robotics (AQTR)*, 2010 IEEE International Conference, vol 2, pp.1-6
 47. Doukhnitch, Evgueni and Chefranov, Alexander G and Mahmoud, Ahmed. (2013). Encryption Schemes with Hyper-Complex Number Systems and Their Hardware-Oriented Implementation, *Theory and Practice of Cryptography Solutions for Secure Information Systems*}, vol 110, IGI Global
 48. Mahmoud, AY and Chefranov, Alexander G. (2012). Secure hill cipher modification based on generalized permutation matrix SHC-GPM, *journal of Information Sciences Letters*, pp. 91-102
 49. Chefranov, Alexander G and Mahmoud, Ahmed Y. (2013). Commutative Matrix-based Diffie-Hellman-Like Key-Exchange Protocol, *Information Sciences and Systems 2013*, pp. 317-324, Springer, Cham
 50. Mahmoud, Ahmed Y and Chefranov, Alexander G. (2014). A Hill Cipher Modification Based on Eigenvalues Extension with Dynamic Key Size HCM-EXDKS, *International Journal of Computer Network and Information Security*, vol 6:5, Modern Education and Computer Science Press
 51. Chefranov, Alexander G and Mahmoud, Ahmed Y. (2010). Elgamal public key cryptosystem and signature scheme in GU (m, p, n), *Proceedings of the 3rd international conference on Security of information and networks*, pp. 164-167, ACM
 52. Mahmoud, Ahmed Yehya Ahmed. (2012). Development of Matrix Cipher Modifications and Key Exchange Protocol, Ph.D thesis, Eastern Mediterranean University (EMU)
 53. Mahmoud, Ahmed Y. and Mahdi, Ali Osama. (2016). Comments On Multi-window Against Mobile Application Lock, *Journal of Multidisciplinary Engineering Science Studies (JMESS)*, vol 2:5, May – 2016, pp. 494-497, JMESS
 54. Abdelwahed, Ann S. and Mahmoud, Ahmed Y. and Bdair, Ramiz A. (2017). Information Security Policies and their Relationship with the Effectiveness of the Management Information Systems of Major Palestinian Universities in the Gaza Strip, *International Journal of Information Science and Management*, vol 15:1, pp. 1-26.
-