

Rules of Tajweed the Holy Quran Intelligent Tutoring System

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Abstract: Undeniably, the greatest way for a Moslem to be closer to Allah, is recitation of Holy-Quran approves with the method conveyed from Messenger of Allah Mohammed from the feature of speech points of letters and the intrinsic and fleeting characteristics of the letters, So, there is a persistent need to teach all Moslems the science of Tajweed Al-Quran.

ITS (Intelligent Tutoring System) is computer software that supplies direct and tailored training or response to students without human teacher interfering. The main target of ITS is smoothing the learning process using the wide-ranging facilities of computer. The proposed system will be implemented using the ITSB Authoring tool. In this thesis, the researcher presents an intelligent tutoring system for teaching Reciting Al-Quran "Tajweed" with Rewayah: Hafs from 'Aasem by the way of Shatebiyyah. It was a novel idea that the researcher combined the science of Tajweed Al-Quran and the science of artificial intelligence in his thesis. The researcher arranged the material into chapters, lessons, examples then, added all these to the proposed system. He also added questions, right answers and the level of difficulty for each lesson. He prepared an exam for each chapter and a final exam to test the knowledge of the learner in the whole material. The system was evaluated by teachers and students in reciting science and the outcome of the assessment was encouraging and promising.

Keywords: ITS, ITSB, Expert system, Tajweed, Holy Quran, Quran recitation

1. INTRODUCTION

At the revelation of the Holy Quran to Prophet Muhammad pbuh, an attention began to its recitation as taught by the Prophet Muhammad pbuh. Then, Muslims learned this recitation from teachers verbally.

Allah has ordered his Messenger Prophet Mohammed and all Moslems also to recite the Quran as it was revealed, (وَرَتَّلِ) (القرآنُ تَرْتِيلًا) [Surat mozamel-verse 4].

Knowledge of Tajweed is (fard kifayah), in other word, some of Muslims have to know it, but applying it is (fard 'ain) means it is required for all Muslims.

Tajweed definition, in the language, is improvement, but the applied definition is pronouncing each letter of Al-Quran from its articulation point and giving the privileges, it is preservative way for the tongue from making mistakes in reading Al-Quran, it is also one of the greatest grateful of science because it is relative to Allah's words.

From the practical view, Prophet Mohammed صلى الله عليه وسلم initiated the rules of Tajweed, because the Quran was exposed to him from Allah by honorable, Jibreel عليه السلام.

Taking into account the new population projections by the Pew Research Center, Muslims and Islam: Key findings in the U.S. and around the world, August 9, 2017, so teaching Tajweed becomes very difficult for the increasing of the Muslims[36].

Nowadays, with the great revolution of computers, many researchers directed their concerns to the work of computer programs to serve the Holy Quran especially teaching Tajweed, but these programs are still very limited, and there is no interference from the learner, one just read, watch, listen and search only [7].

Actually, the researcher learned four courses in "Tajweed Al-Quran" science, in Dar Al-Quran Wa Sunnah, and he passes all the exams in each course.

The first one was "beginner's course" from 20/5/2005 to 10/9/2005, second one was "advance" from 1/12/2005 to 12/5/2006 shown. Both courses were Tajweed Al-Quran with Rewayah Hafs from 'Aasem by the way of Shatebiyyah. The third course was Tajweed Al-Quran with Rewayah Warsh from Nafe', The last course was "preparing for sanad" with Rewayah Hafs from 'Aasem by the way of Shatebiyyah dated 1/4/2010 to 10/1/2011.

He learned Tajweed also in Halaqat "Groups with teacher" to improve reciting. He is teaching such courses and Halaqat of reciting improvement, so he believes that he has the ability to do such work.

1.1 STATEMENT OF THE PROBLEM

A special carefulness was initiated to recitation of the Holy Quran as revealed to Prophet Muhammad (pbuh) by learning Tajweed.

وعن عائشة رضي الله عنها قالت: قال رسول الله صلى الله عليه وسلم: "الذي يقرأ القرآن وهو ماهر به مع السفرة الكرام البررة، والذي يقرأ القرآن ويتتعتع فيه وهو عليه شاق له أجران" (متفق عليه)

'Aishah (May Allah be pleased with her) said:

The Messenger of Allah (صلى الله عليه وسلم) said, "the one who recites Al-Quran cleverly will be with respectful scribes and one who recites Al-Quran with great difficulties, doing the best to recite in the best way possible, will take reward twice.

روى الترمذي (2910) عن عبد الله بن مسعود، قال: قال رسول الله صلى الله عليه وسلم: (مَنْ قَرَأَ حَرْفًا مِنْ كِتَابِ اللَّهِ فَلَهُ بِهِ حَسَنَةٌ ، وَالحَسَنَةُ بِعَشْرِ أَمْثَالِهَا، لَا أَقُولُ الم حَرْفٌ، وَلَكِنْ أَلِفٌ حَرْفٌ وَلاَمٌ حَرْفٌ وَمِيمٌ حَرْفٌ) ، وصححه الألباني في "صحيح الترمذي".

Each Moslem must read Quran, at least, in praying, so the learning how to read the Holy Quran becomes an urgent need, because when one reads Al-Quran even one verse, must take in mind the rules of "Tajweed" to improve reading in order to have great rewards, if not, he/she may make mistakes in reading, then commits sins.

There are some of the difficulties to do that in the traditional teaching:

- One teacher teaches many students, so he/she cannot care to every student.
- Some people learn slowly, with human teachers there is no sufficient time.
- Shyness, hesitation and fear prevent some students from asking the teacher.
- Negligence of various background information of students.
- Material is delivered with same teaching method for all students irrespective of various altitudes of understanding.
- Not all learners understand with the same style of teaching, some are visual learners, others are audio learners.
- Referring to books of Tajweed take time and effort.
- There are students with special needs, so they cannot follow the teacher.
- Teachers are not available every time and everywhere.
- Old age learners of Tajweed face psychological difficulties with young teachers.

All these problems can be solved by the proposed ITS system.

- One-to-one teaching (one teacher for each student).
- Immediate feedback.
- Learner chooses any lesson freely depending on their knowledge.
- Available all the time.

Teaching Tajweed material has special requirements, reading rules are not sufficient to learn, it needs audio and video to imitate correctly.

1.2 OBJECTIVES

The aim of this thesis is to minimize the difficulties faced in learning Tajweed, such as giving more time to learn, remove fear, shyness from learner, demonstrating the specific subject as needed, available all time anywhere and creating the suitable environment for studying.

1.3 SIGNIFICANCE OF THE STUDY

The proposed ITS system for teaching Tajweed Rules bind Artificial Intelligence and education, which achieves many aspirations. One is matching the special needs of each student; afford various techniques of the material and the user interaction.

The system adapts its model according to student’s responses by giving questions of the suitable difficulty level for the student, and showing an explanation of mistakes to direct him/here what to study again. The student’s privacy is achieved including level of difficulty reached, score obtained.

The questions, which are posed to the learner are chosen randomly from the system on the level reached.

1.4 LIMITATIONS

In recitation of Quran, there are ten Qira'at, twenty riwayat and a lot of turuq as shown in Figure 1. This proposed system cover the first level of tajweed with Rewaya Hafs from ‘Aasem by the way of Shatebiyyah بطريق الشاطبية.

Figure 1: Qira'at, riwayat and turuq
 The attribution of Hafs to Prophet Mohammed صلى الله عليه وسلم is shown in Figure 2.

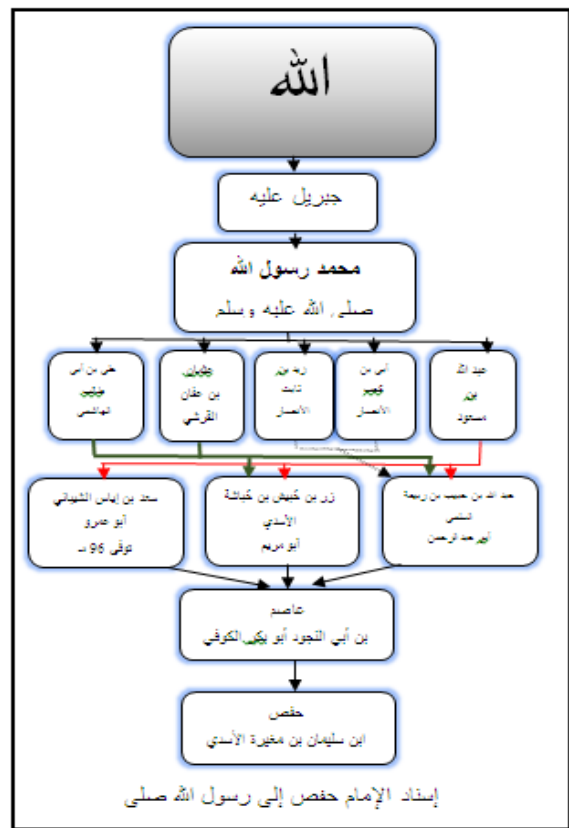


Figure 2: Attribution of Hafs

2. INTELLIGENT TUTORING SYSTEMS BACKGROUND

2.1 ITS DEFINITION

The technological revolution indicates that the dependence of traditional education (which lectures are static in time and space) will decrease gradually.

Artificial intelligence, is the science making computers to take the place of the intelligence of human, with inmost understanding of knowledge, mainly representation and reasoning about "how to" knowledge, like procedural knowledge.

Cognitive science, or research into understanding how people act intelligently, leads to a deeper understanding of how people think, solve problems, and learn.

AI and cognitive science, two sides of a single coin that is, understanding the nature of intelligent work, in which entity is obvious.

Often, AI techniques are used to build software models of cognitive processes, while the results of cognitive science are used to develop more artificial intelligence techniques to emulate human behavior.

AI techniques are used in education to model student knowledge, academic subjects, and teaching approaches.

One-on-one tutoring is well documented as the best way to learn [35].

2.2 ITS OBJECTIVES

The field of artificial intelligence and education has many objectives:

- Adaptation on the requirements of individual students by using different styles in illustrations of content, tracks through material, and a lot of interfaces.
- Recognizing how human emotion affects individual differences in learning, and the level to which emotion, reasoning capability and gender impact.
- The field is derivative and innovative. It gets theories and approaches from related fields such as AI, cognitive science, and education; also it creates its own larger research questions.
- Teachers who use these tutors get insight into student learning progressions.

2.3 SPECIAL NEEDS

- **Intelligent tutors know individual student differences.**
Tutors have background knowledge of each student, learning style, current needs and choice of multimedia materials at the appropriate teaching level and style.
- **Students work independently or in teams.**
Groups of learners, separated by teachers easily modify subjects, reproduce tutors, infinitely cost to students space and time, and cooperate on open-ended problems.

- **Necessary hardware and software.**
Students work on personal computers or with sophisticated servers managed within the school zone.
- **Intelligent tutors know how to teach.**
Academic materials stored in intelligent systems are not just statements about the subject. Instead, these programs contain qualitative examples of each area to be taught, including things and processes that distinguish trends and causal relationships between subjects.

2.4 ITS ARCHITECTURE

The architecture of ITS system contains domain model which contains the material to be educated, pedagogical (expert) module which controls intelligently all the roles of the system, student model which contains the information of the learner, and user interface model which is the communication between the user and the application as shown in Figure 3.

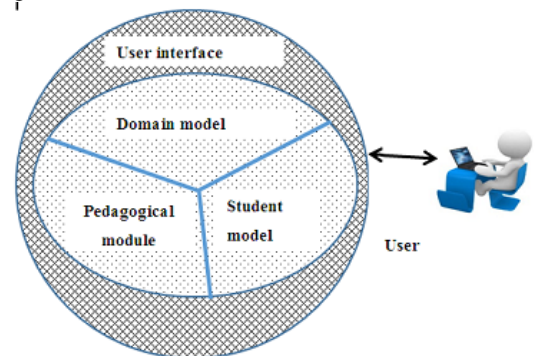


Figure 3: The architecture of ITS system

3. LITERATURE REVIEW

With the development of life and massive development of computer technology, the human has become dependent on computers applications heavily in most fields, especially in learning.

3.1 PREVIOUS STUDEIES

There are many intelligent tutoring systems used in learning; the following are some of them: The study of [2] Intelligent Tutoring System for Deaf Learners of Written English. This system is called ICICLE (Interactive Computer Identification and Correction of Language Errors) which has an error identification module to identify errors in a text, and response generation module to create dialogue. The study of [3] Student Modeling in an Intelligent Tutoring System for the Passive Voice of English Language. In this system, if the student writes the solution to the posed question, the system tests if it is right, else it attempts to analyze the mistake. The study of [9] An Intelligent Tutoring System for Teaching Grammar English Tenses. A system designed to students learning English language. It shows English Grammar tenses, and then produces questions automatically for the

students to solve. The study of [4] An Intelligent Tutoring System for Teaching the Grammar of the Arabic Language. The system is designed for students of elementary schools in the fourth grade in Egypt. It supports the education process with multimedia (sound, images and text). The study of [12] An Intelligent Tutoring System for Java Expression Evaluation. This system is called JEE-Tutor which teaches Java operator precedence and expressions for the students learning Java programming Language. The study of [13] An Intelligent Tutoring System for Learning Java Object. This system shows the material of Java objects and generates questions automatically for learner to answer. The system customized upon the progress of each learner. The study of [14] Design and Development of an Intelligent Tutoring System for C# Language. This system was designed; by using ITSB authoring tool; to help learners to study C# programming language. The study of [15] A comparative study between Animated Intelligent Tutoring Systems (AITS) and Video-based Intelligent Tutoring Systems. This study showed that ITS developed the performance of students in biology exams, and that Video-based Intelligent Tutoring Systems are much better than Animated Intelligent Tutoring Systems (AITS). The study of [16] Developing an intelligent tutoring system for students learning to program in C++. This study developed an intelligent tutoring system for assistance of students registered in computer sciences 1 (an introduction of C++ programming course) at the Faculty of Engineering and Information technology in Al-Azhar University.

Furthermore other intelligent tutoring systems such as e-learning [17], database [18, 19, 20, 21], biology [22, 23], and teaching Java Programming language [1]. An excellent effort was done in Book of Tajweed Rules of the Qur'an Part One, by Kareema Carol Czereepinski, 2000 [5], but learner can read only without participating or checking what he/she understand of the material. Automated tajweed checking rules engine for Quranic learning 2013 [8], very good work but was tested only on sora al-fatiha. Most of the techniques of teaching Tajweed are written like books to read, videos to watch, sounds to hear, and all these make person a receiver only; it means that there is no participation of the learner, and there is no way to test what one understand from the lessons. A very good starting point to teach Tajweed is in paper titled "Teaching the Right Letter Pronunciation in Reciting the Holy Quran Using Intelligent Tutoring System" [11]. The researcher is one of the two authors - but it was designed to teach one subject only in Tajweed "Tafkhim and Tarqiq in TAJWEED" the Holy Quran, Rewaya: Hafis from 'Aasem.

3.2 COMMENTS ABOUT PREVIOUS STUDIES

After looking at aforementioned studies, the researcher did not find any study that uses the new idea of intelligent tutoring system. So, the proposed system is considered to be

the first one that combines the intelligent tutoring system and TAJWEED the Holy Quran.

4. RESEARCH METHODOLOGY

4.1 METHODOLOGY

These steps are followed:

1. Gather data of rules of Tajweed with Rewaya: Hafis from 'Aasem by the way of Shatebiyyah [6], [24], [25], [28], [29], [30].
2. Organize lessons.
3. Dividing the material into chapters containing appropriate lessons.
4. Add the chapters and the lessons to the proposed system.
5. Prepare examples to each lesson.
6. Add the examples to the proposed system with linkage to the appropriate lesson.
7. Using text, graphic [26], sound and video in explaining the material.
8. Cutting parts of videos (Dr. Ayman Rushdi Swid [27], Dr. Mohammad Isam Al Quda [37], and Sheikh Ahmed Mohamed Amer [38]) and audios of recorded materials for explaining the right pronunciation in special cases.
9. Prepare questions for each lesson (with difficulty levels).
10. Prepare exams for each chapter (with difficulty levels).
11. Add the questions, answers with style (True/False) or (multiple choice) to the proposed system.
12. Execute and test the system.
13. Let teachers and learners use the system, and take their feedback with a questionnaire.
14. Check the system again and again depending on the feedback gained.

The researcher used the following various materials to enhance the style of teaching:

- Peom of Jazaria which is considered as one of the important poems in the science of Tajweed. It got the attention of scientists and specialists since it was organized by the Imam of readers Abu Hassan Mohammed bin al-Jazri[31].
- The poem of Tohtat Al-Atfal was written by Sheikh Jamzoury containing some of the rules of Tajweed in 1198 Hijri[32].
- The book Al-Nashr in the ten Qira'at of Ibn Al-Jazri is ranked as one the most helpful of books in Tajweed. Ibn al-Jazri addressed all the correct ways of the ten readings, and this book is the essence of books written by Ibn al-Jazri in Tajweed science[33].
- Mistakes in audio recordings of the Holy Quran and ways of treatment, Dr. Abdulrahman Yousef Ahmed Al-Jamal. Haifa Abdelraouf Ibrahim

Radwan. The research was presented in the First International Scientific Conference, The Holy Quran and its role in addressing the issues of the nation organized by Center of the Holy Quran and Islamic Dawa, Faculty of the fundamentals of religion - Islamic University – Gaza , 16, 17 December 2008[34].

4.2 ITS AUTHORIZING LANGUAGE

The researcher used the Intelligent Tutoring System Builder (ITSB) tool to assemble an intelligent tutoring system for teaching the Tajweed rules. ITSB authoring tool support English and Arabic languages, it has two interfaces one for teachers from which he/she can add material, questions and answers, the other for students to learn the material and answer the questions.

4.3 PROPOSED ITS ARCHITECTURE

The architecture of ITS system contains expert model, student model, domain model and user interface model as shown in Figure 3 in section 2.

4.3.1 Student Model

There is a profile for each learner includes some data about him/her like name, number, login date, score and difficulty level reached.

4.3.2 Expert Model

It works as a controller that manages the functionality of the system throughout this module; a student can answer questions starting from first difficulty level. If the student got 75% marks or higher in any level, he/she can move to next difficulty level. However, If the student marks below 75% and above 50 % the ITS system force him to repeat exercises of the same difficulty level again in random way. In the case the student get score below 50%, the ITS system force the student to go back and study the related lesson then come back to answer the exercises.

4.3.3 User Interface Model

It is the communication model (with two interfaces) between user and the application designed; one for the teacher to add lessons, examples and questions with the right answers for each one, and the learner to read lessons, examples and test his/her understanding by answering questions of exams.

The researcher uses the features of the ITSB such as texts, colors, graphics, audio and video to improve the motivation of the learner.

4.3.4 Domain Model

The material is arranged to eight chapters which contain 83 lessons and 153 examples. There are exams at the end of each chapter, and final exam for all chapters (147 questions for all exams.).

Learner can decide to start with any chapter's exam and test himself/herself, depending on the feedback he/she decides to skip this chapter or to study it.

Another way, for advanced learner, one can start with the final exam for all chapters, then choose lessons to study to improve himself /herself in the material.

Learner is developed gradually from correcting clear mistakes in reading Al-Quran, to slightly hidden ones to extremely hidden by listening to Sound recordings of reciting and answer if there are mistakes in it or not.

The material is divided as the following:

Chapter 1

Introduction

Reward Recitation فضل تلاوة القرآن الكريم

The etiquette of recitation آداب تلاوة القرآن الكريم

Imam Asim الإمام عاصم

Imam Hafs الإمام حفص

Exercises for Chapter 1

Chapter 2

Tajweed (definition, divisions and verdict)

Speeds of Tajweed مراتب التلاوة

Types of Tajweed's mistakes وأنواعه (الخطأ)

Recourse الإستعاذة

Basmala (by name of God) البسملة

Starting and stopping reading الإبتداء والوقوف

Stop reading, to continue الوقف

End reading القطع

Start reading الإبتداء

Silence for a while within reading السكت

Terms of stopping مصطلحات الوقف

Exercises for Chapter 2

Chapter 3

How to begin reading with conjunctive Hamzah

كيفية الإبتداء بهمزة الوصل

Break and conjunctive Hamzah in one word

اجتماع همزتي الوصل والقطع في كلمة واحدة

Two sakens حكم التقاء ساكنين

Makharej of letters مخارج الحروف

The interior of chest (estimated while all others are true, one

makhraj, vowel sounds alif, waw and ya)

The throat (three makharij, 6 letters, hamzah, haa, 'ayn, haa, ghayn and khaa)

The tongue (ten makharij, eighteen letters qaf, kaf, jim, sheen, constant ya, dhaad, lam, noon , raa, taa, daal, taa, saad, seen, zay, thaa, dhal, tha)

The lips (four letters baa, meem constant waw and faa)

The nasal passage (one makhraj al-ghunnah)

Training of correct pronunciation

Styles of letters ألقاب الحروف

Characteristics of letters صفات الحروف

with inverse صفات ذاتية لها ضد

without inverse صفات ذاتية ليس لها ضد

Exercises for Chapter 3

Chapter 4

Magnification and Thinning (Tafkhim and Tarqiq)

حروف مفخمة دائما Letters always magnified

حروف مرققة دائما Letters always thinned

حروف مفخمة احيانا و مرققة احيانا Letters sometimes magnified, other time thinned

احكام لام ال التعريف Rules of Lam 'al'

احكام النون 'noon sakena and tanween'

الساكنة والتنوين

إظهار حلقى Ithhar from throat

إدغام Idgham

إقلاب Iqlab

إخفاء Ikhfa'

Exercises for Chapter 4

Chapter 5

أحكام الميم الساكنة 'meem sakena'

إظهار شفوي Ithhar from lips

إدغام شفوي Idgham from lips

إخفاء شفوي Ikhfa' from lips

أحكام الحروف المشددة Rules of doubled letters

Identical, Convergent Consistent and far 2 letters

المتماثلان، المتقاربان، المتجانسان و المتباعدان

Exercises for Chapter 5

Chapter 6

أحكام المدود madd

المد الأصلي Asli: Original madd and extensions

وملحقاته

المد الفرعي Far'i: Derived madd

المد بسبب الهمز Maad because of 'hamza'

المد بسبب السكون Maad because of 'sokon'

مراتب المدود Ranks of madd

Exercises for Chapter 6

Chapter 7

ما يراعى لحفص Special of Hafs

الألفات السبع The seven Alef

Exercises for Chapter 7

Chapter 8

تطبيق Applying recitation on some ayat and sora

علم التجويد على بعض الآيات واسور

Exercises for Chapter 8

Chapter 9

متن الجزرية Maten al-Jazaria

Comprehensive examination

Let the student hear recording Quran then answer questions.

The Arabic letters, name and symbols used in the research are shown in Table 2. Table 3 shows Arabic harakat.

Table 1: Arabic letters and symbols used

Arabic letter	Name	Symbol used	Arabic letter	Name	Symbol used
ا	alif	Aa	ظ	thaa	th
ب	baa	B	ع	'ayn	'

ت	taa	T	غ	ghayn	gh
ث	thaa	th	ف	faa	f
ج	jeem	J	ق	qaaf	q
ح	haa	H	ك	kaaf	k
خ	khaa	kh	ل	laam	l
د	daal	D	م	meem	m
ذ	dhal	dh	ن	noon	n
ر	raa	R	هـ	haa	h
ز	zay	Z	و	waaw	w
س	seen	S	و as vowel	waaw	oo
ش	sheen	sh	ي	yaa	y
ص	saad	S	ي as vowel	yaa	ee
ض	dhad	dh	ء	Hamza	'
ط	taa	T			

Table 2: Arabic harakat and symbol used

Arabic harakah	Name	Symbol used
َ	Fathah	A
ُ	dhammah	U
ِ	Kasrah	I
ّ	Shaddah	Double letter
◌	Sukoon	Absence of vowel

4.3.5 Screen samples

These are some various screenshots for the proposed ITS system presenting many types of the interface between system and user including log-in Figure 4, adding lessons/examples Figure 5, questions and answers Figure 6, introductory screen Figure 7, correcting mistakes Figures 8, 13, 14, silence Figures 9, 10, Makharij illustration Figure 11, video poem Al-Jazaria sound of Sheikh Sa'd el-ghamdy Figure 12, 32, tables and diagrams show the characteristics of letters Figure 15, 16, 18, 19, 20, video poem Tohfah al-atal noon sakena rule Figure 17, video Dr. Moahammed Isam al-Quda how to pronounce noon and meem doubled Figure 21, Madd Figure 22,23, special for Imam Hafs Figure 24, video how to say the word تَأْمَنًا for Dr. Ayman Sweed Figure 25, the seven Alefat Figure 26, explain the rules of Tajweed at Al-Fateha sora سورة الفاتحة Figures 27, 28, 29, sora Al-Maida aya 95 سورة المائدة الآية 95 contains most of Tajweed rules Figure 30, video sheikh Ahmed Amer explaining sora al-fateha سورة الفاتحة Figure 31, references Figure 33, Judgment of reading Quran with mistakes - Sheik Mohamed ben Saleh al-othaymeen Figure 34.

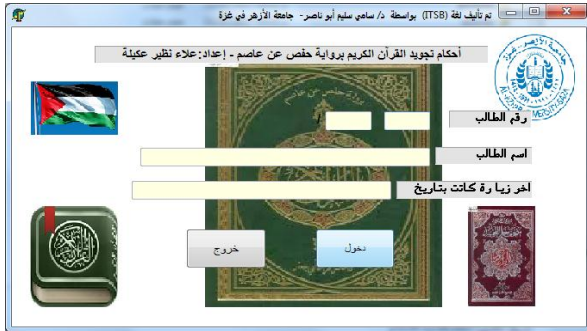


Figure 4: Log-in screen

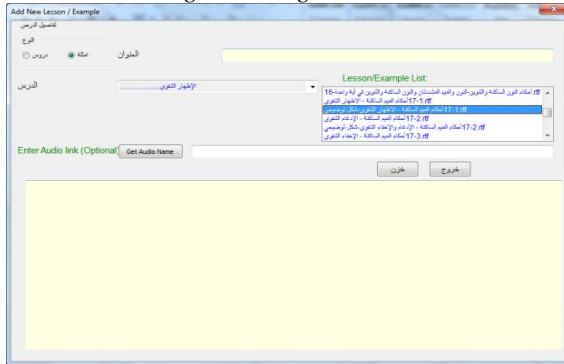


Figure 5: add new lesson / example

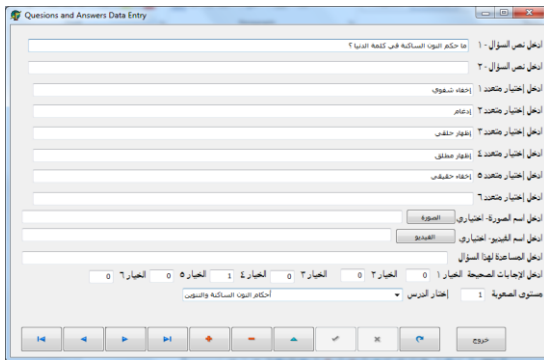


Figure 6: add questions and right answers

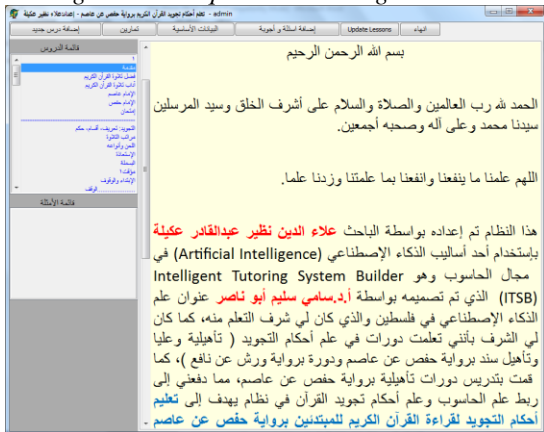


Figure 7: Introductory screen

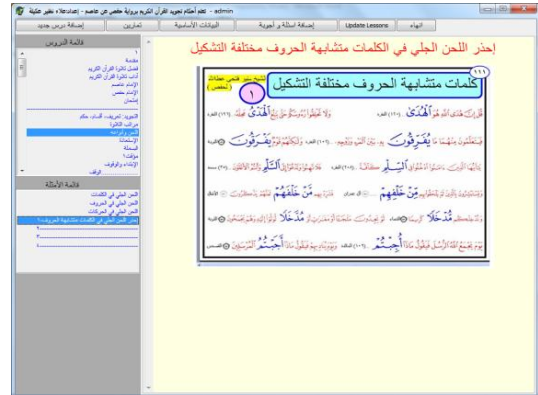


Figure 8: sample of clear mistakes



Figure 9: Silence for a while within reading



Figure 10: Terms of stopping

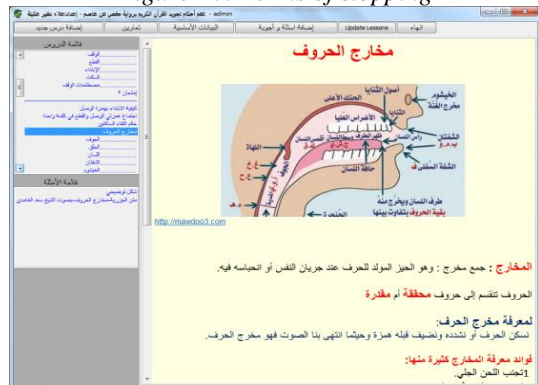


Figure 11: Makharej of letters

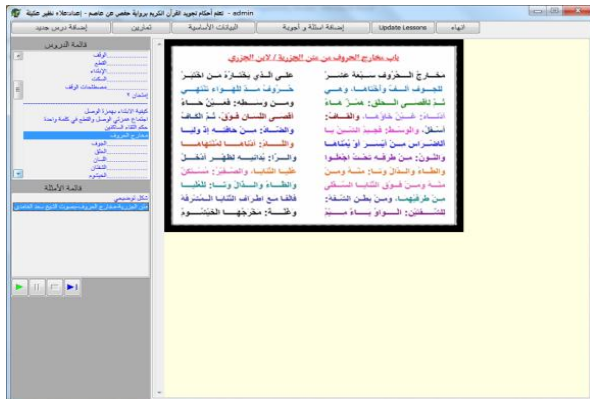


Figure 12: poetry of makharej / ebin al-Jazary sound sheikh Sa'd El-ghamdy



Figure 13: pronunciation of dhad letter ض



Figure 14: clear mistakes in ص س ز letters

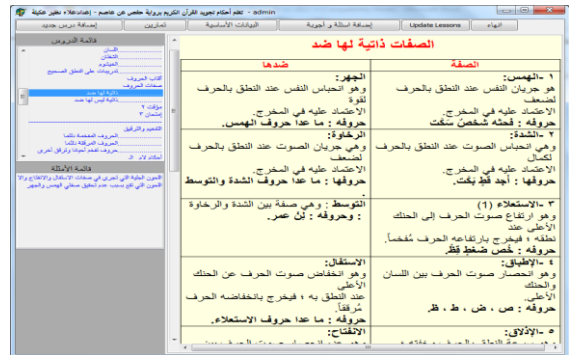


Figure 15: Characteristics of letters with inverse

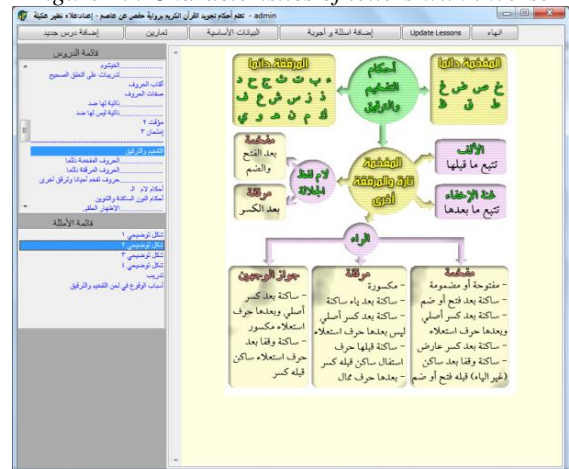


Figure 16: Magnification and Thinning (Tafhim and Tarqiq)

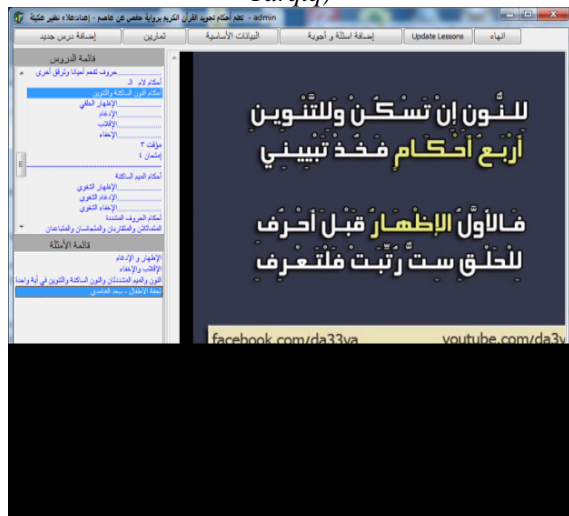


Figure 17: poem tohfat el-afal for rules of 'noon sakena and tanween'-voice of sheikh sa'd el-ghamdy

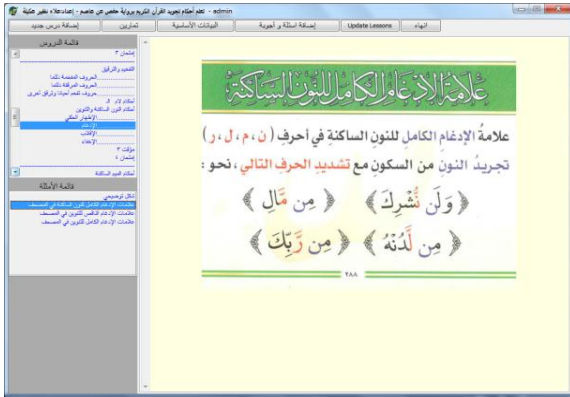


Figure 18: term of full Idgham of noon sakena in Al-Quran

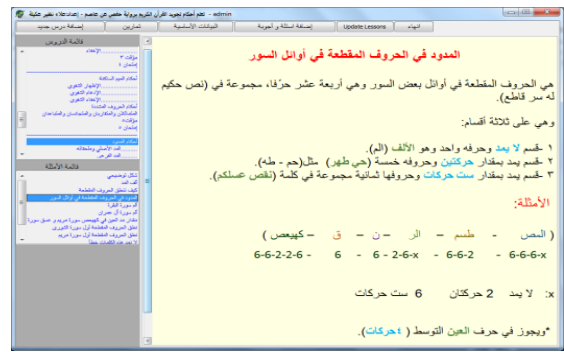


Figure 22: madd in cutted letters in the beginning of sora's



Figure 19: Differences between Idgham and Ikhaaf'

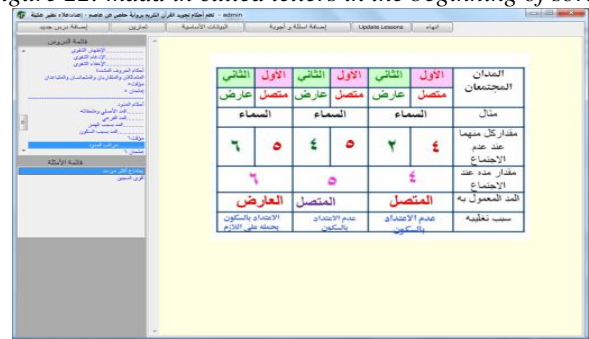


Figure 23: Ranks of madd

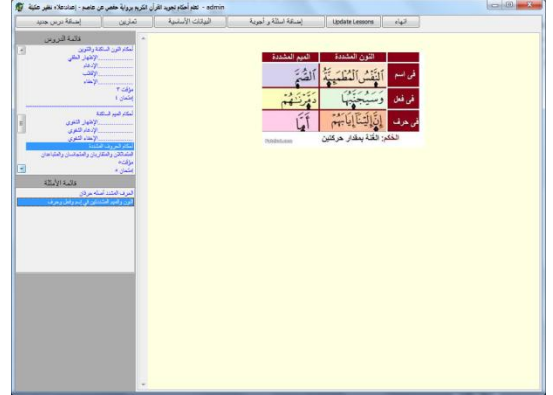


Figure 20: Sample of noon and meem doubled in noun, verb and letter



Figure 24: Special of Hafs



Figure 21: pronunciation of noon and meem doubled vedio sheikh dr. mohamed isaam al-qudah



Figure 25: Pronunciation of word special for Hafs Video Dr. Ayman Sweed

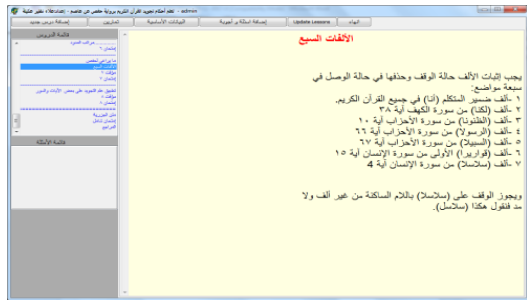


Figure 26: The seven Alef

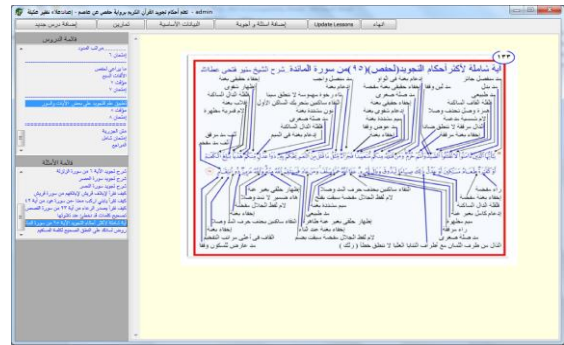


Figure 30: : Rules of Tajweed at sora aya المائة 95

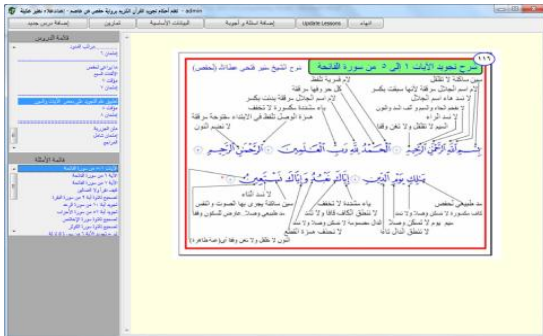


Figure 27: Rules of Tajweed at sora الفاتحة part 1

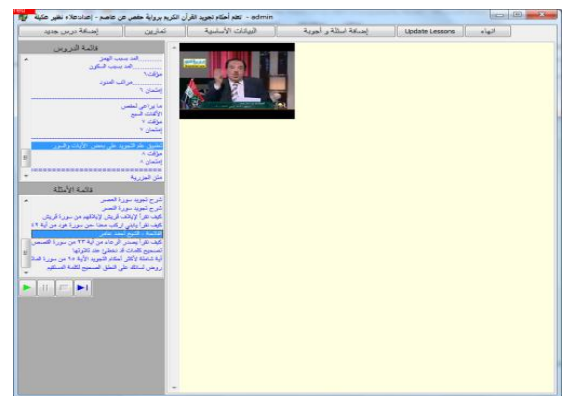


Figure 31: Video for sheikh Ahmed Amer for reading sora الفاتحة

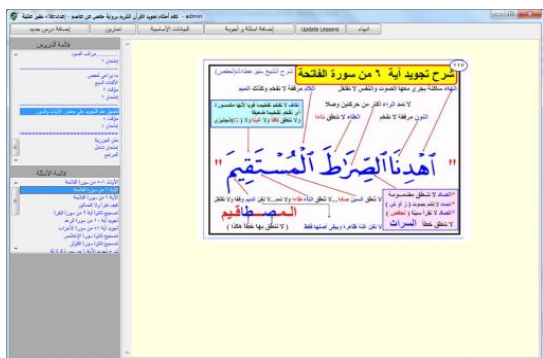


Figure 28: : Rules of Tajweed at sora الفاتحة part 2



Figure 32: poetry of Jazaria - sound sheikh Sa'd El-ghamdy

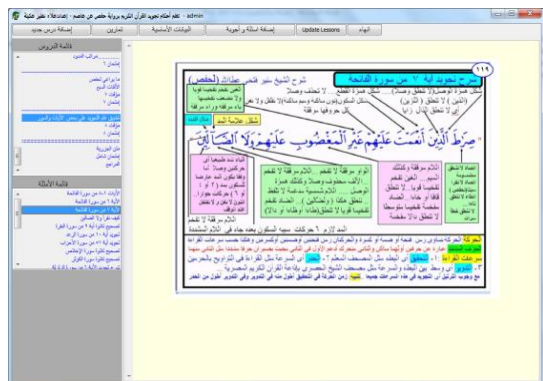


Figure 29: : Rules of Tajweed at sora الفاتحة part 3



Figure 33: References



Figure 34: Judgment of reading Quran with mistakes - Sheikh Mohamed ben Saleh al-othaymeen

5. EVALUATION

5.1 SYSTEM EVALUATION

System evaluation is a measure of the quality of the application that indicates the effectiveness, efficiency and satisfaction that users can perform tasks using the application. The usability assessment is now an essential part of the system development process, and a variety of questions have been developed to assess the system by the Tajweed Teachers and the students learning this subject. We have introduced this ITS system to a group of students and teachers who are specialists in the field. We asked both groups to evaluate the ITS system and answer the following questions about the ITS system. The results of both groups were as follows:

5.2 QUESTIONS ABOUT THE ITS SYSTEM FOR THE TEACHERS AND THE STUDENTS:

1. It is easy to use the Tajweed ITS.
2. The material in the system is very well organized
3. It was easy to learn Tajweed using the ITS system
4. It is comfortable and pleasant using this system.
5. The interface of this system is user friendly.
6. The use utilizes many multimedia features: Video, audio, images.

In evaluating the application model, evaluators (20 Teachers/ 20 Students) are required to use the ITS system. After that, users are asked to provide impression about the ITS system through a survey.

In this way, effectiveness, efficiency and satisfaction of ITS system were measured as shown in the above questions; the results were very encouraging and promising.

The results of the evaluation of both groups (Teachers and Students) are shown in Table 4, Figure35, Figure 36, and Figure 37.

Table 3: Average scores of the evaluation of both Teachers and Students

Question	Teachers	Students
It is easy to use the Tajweed ITS.	95 %	85 %
The material in the system is very well organized	90 %	96 %
It was easy to learn Tajweed using the ITS	100 %	100 %

system		
It is comfortable and pleasant using this system.	87 %	97 %
The interface of this system is user friendly.	95 %	91 %
The use utilizes many multimedia features: Video, audio, images	100 %	95 %
Overall average satisfaction	94.5 %	94 %

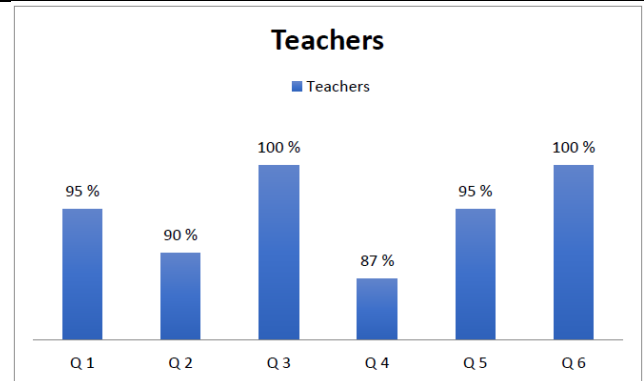


Figure 35: The results were obtained by the Teachers

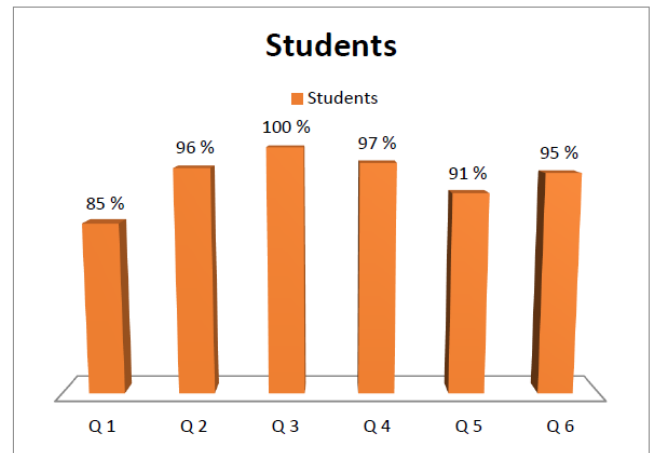


Figure 36: The results were obtained by the students

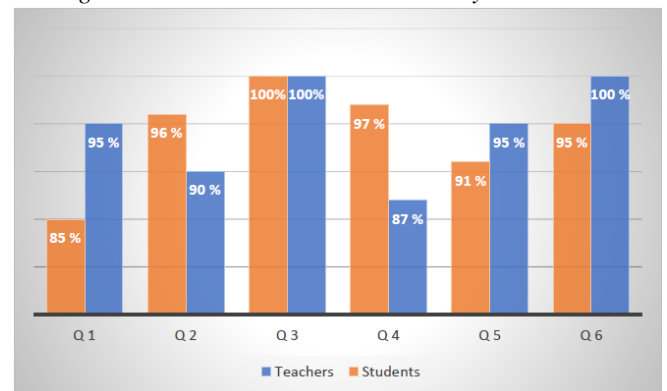


Figure 37: Comparison of results by Teachers and students

6. CONCLUSION

Many Muslims faces a lot of problems in reciting the Holy Quran due to the numerous rules of Tajweed and shyness of

old people in making reading mistakes in front of the teacher.

To overcome these problems an intelligent tutoring system for teaching Reciting Al-Quran "Tajweed" with Rewaya: Hafsa from 'Aasem by the way of Shatebiyyah (the most popular rewaya in many countries) was presented. This system provides direct, personalized training and feedback to student's intendant of human teacher.

The system was tested by two groups of users, one for teachers second for students and they were asked to run the system then evaluate its simplicity, the material and the user interface. They reported that the system overcomes most of the problems in teaching rules of Tajweed in the traditional teaching and mention that it achieves adaptation upon the needs of each student.

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