

# AI-Powered Tutoring System Designed for Omani Primary School Curriculum

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DOI : <https://doi.org/10.51244/IJRSI.2024.1114SDAICO2>

Received: 04 July 2024; Accepted: 30 July 2024; Published: 02 November 2024

## ABSTRACT

The growing race to develop Intelligent tutoring systems; and the transformation of traditional education systems into smart systems using artificial intelligence technology. Which shortened the time to improve the level of education and help learners to a deeper understanding of the material studied taking into account different levels of understanding. It is possible to devise a definition of Intelligent tutoring systems (ITS), a software that serves learners and contains elements of artificial intelligence.

ITS technologies have become widely used in various fields of education, including science and mathematics education, which has led to a breakthrough in the progress of learning. This program tracks students' comments and opinions. The program then draws conclusions about the weaknesses students face, offering tips and advice that will motivate them and provide additional work to suit their weaknesses (Sulaiman Al Shabibi and Silvennoinen, 2018). In this thesis, we will present proposals for the introduction and application of ITS to the students of Oman

**Keywords:** AI, Machine Learning, Learning Management System

## INTRODUCTION

In the past few years, computer programs and computers have been able to control the field and method of education through several new methods using artificial intelligence. Artificial intelligence has led to major breakthroughs in education using these techniques that have simulated human feelings and sensations in a very precise way Facilitated the process of learning and knowledge sharing with minimal effort (Pappas and Drigas, 2016).

Our knowledge of artificial intelligence has begun through the science fiction movies that are shown on television, and today they are part of our daily lives. We use them in many areas that we cannot dispense with. Examples:

- On e-mail when we filter unwanted spam by using a word, we use artificial intelligence here.
- Also in education, there are many tools that will serve the learners and teachers as well as Google search service, plagiarism check, the generator of quotations and alternative terms that are proposed by Google. By looking at everyday applications that we do not use and using artificial intelligence, it is possible to use artificial intelligence to support the education process for the best and enable anyone who has a computer to learn anywhere in the world in different ways and help organizations to accomplish the tasks of education.

- In Shopping, apps offer you some products based on your purchase history and products close to the product you want. The add-on can also protect you from fraud through unsecured transfers based on a location different from your site specified in the system.

Artificial intelligence can support education not only by providing some digital materials in the computer network, but by providing responses to instructional queries, but artificial intelligence can provide support to students through the difficulties encountered by tutoring system in artificial intelligence.

### AI-based tutoring systems model

The learning model stores separate information for each student in an individual database for each student. And then provide content for each student based on his level of education and ability to absorb the content of the course material. As shown in the Figure

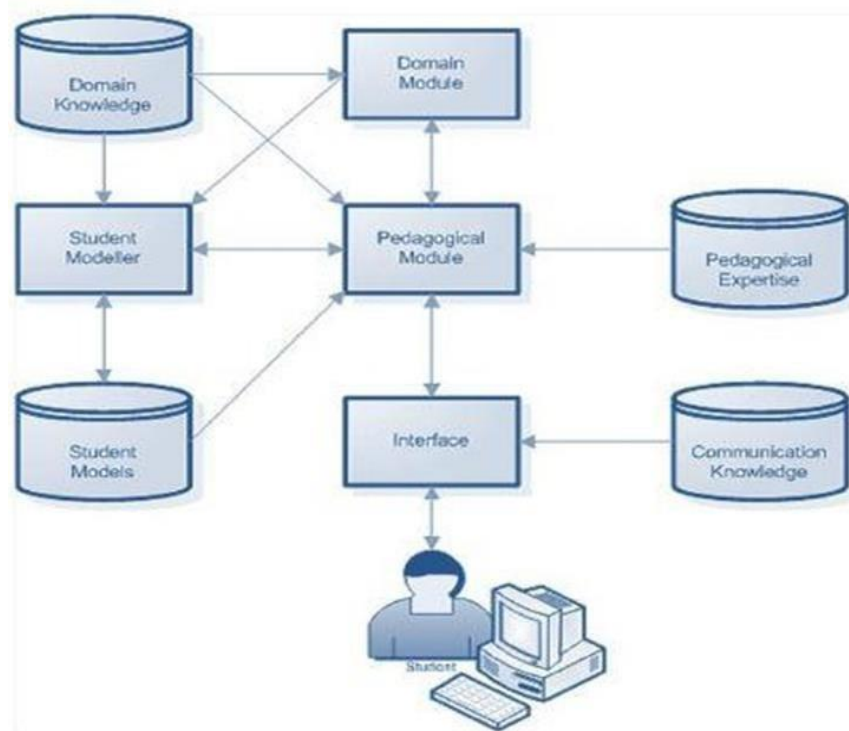


Figure 1 Proposed Framework of AI based tutoring systems model

Based on the level of the learner, ITS is suggested by the content and path of follow-up in a study. Every human mind has limited capabilities in the retention and processing of data within the brain, while these techniques help to shorten the time and support the learner based on his abilities and performance.

### Problem

The biggest problems and obstacles to learning in the Sultanate of Oman and in the world as well, that education depends on collective indoctrination and does not cast the different perceptions of absorption of each student (Alfawair and Al Tobi, 2015). The other problem is the difficulty parents may have in understanding the material content if they want to help the student. As well as the obstacles to education in the Sultanate of Oman curriculum content making it boring. With the huge amounts spent on the training for each teacher individually, there may not be enough time to qualify for each teacher. Among the statistics provided by the Ministry of Education in the Sultanate of Oman in the last years in its annual book (the annual educational statistics book) (The annual educational statistics book, 2017), it is clear that there are very large numbers of people who fail each year in each of the educational stages as shown in the table below.

Year	Repeater
2014	18320
2015	21751
2016	23584
2017	15996

### Students in public education by grade, gender and enrolment status in the academic year 2014,2015,2016 and 2017 (MOE 2018)

This costs a lot of money for the Ministry of Education in the Sultanate of Oman, on the contrary, if there is a mechanism for individual assessment work for each student.

In the regular classroom, students are treated with the same level of knowledge, although their perceptions of understanding are naturally different. This will affect student achievement. Because some students need more time to understand while the other is the opposite. It may be impossible for the teacher to give more time to the student who needs more time to understand because of the lack of time or the presence of other factors do not enable it. If an AI tutoring system is implemented, a very large difference will occur. When using an AI tutoring system and using supporting tools such as data mining (ALAOUI, HACHEM, and ZITI, 2016), it is easy to obtain useful information from the school or ministry records. The level of the student is defined in each subject and the skills he or she possesses, which need to provide an AI tutoring system and facilitate teacher work.

These systems do not of course do the work done by the teacher but do many of the work was in the past very difficult for the teacher to do it or it requires effort and time huh does not fall. Therefore, artificial intelligence represented in these tools is not isolated from the teacher, but it is enhanced to the role and work done by the teacher (CUCU, 2015). Here comes the role of building a relationship between the teacher and the computer to bring out a great work of art is proud of the Sultanate of Oman and help in building this country.

The Sultanate of Oman shares with the countries of the Middle East the problems they face in education. These problems can be said to be crises in education and can be summarized in three factors:

Decrease in the quality of education compared to the amounts spent per capita on education.

There is no correlation between the outputs of education and the labor market.

Although the Sultanate of Oman has implemented the (PRILS) Program for the Study of International Reading and Writing and the (TIMSS) Trends International Mathematics and Science program, the level is still low.

## LITERATURE REVIEW

Many countries adopted such programs among these countries. The United Arab Emirates (Dani, 2018) used the ALEKS (intelligence tutoring system) program to solve many problems of learning in mathematics. This helped in the interaction of students in the classroom and facilitated the teacher as well as a lot of problems, including the return to each student where each student can refer to feedback to solve a lot of issues and also the ease of teacher control students (Chen Chien et al., 2008).

Implementation of the Intelligent Content System in Egypt was implemented by applying a curriculum for Arabic grammar. It was distributed to four primary schools in Egypt. It includes four units, the student model, the teacher model, and the experts model (Mahmoud and Abo El-Hamayed, 2016).

There is an interesting experience that has been implemented in Qatar (Elzeiny and Alja'am, 2016) for children suffering from mental illness and disorder and has been a successful experiment by all standards. The reason for establishing this experience is that children who suffer from the same problems must repeat the lessons for them several times to be absorbed. Which requires large numbers of teachers and also requires a great time for each student separately. But ITS saved this effort and time spent. And gave results of high value compared to the traditional method used in the past.

### Benefits of Intelligent Learning System

The benefits of the Intelligent Learning System in Education in Oman include access to excellence education and the specifications of the first teacher who is able to use the improved computer technology for all students so that there is effective communication between the database and the smart lesson systems through which reports can be obtained permanently On the level of students or students in a classroom using data mining tools it is difficult for the human teacher to provide such reports, Thus, the government will provide huge sums that would have been paid to students who fail to move to the next stage of education. Forcing the government to spend the expenses and efforts of another academic year.

Further benefits of ITS achieve the National Strategy<sup>2</sup>for Education 2040, (The National Strategy for Education 2040, 2018) which aims to improve the level of education. Many plans and strategies have been developed for this purpose, ensuring that the level of the school, the teacher and the student are developed to reach the desired goal.

The most important methodological choice researchers make is based on the distinction between qualitative and quantitative data. As mentioned previously, qualitative data takes the form of descriptions based on language or images, while quantitative data takes the form of numbers. Qualitative data is richer and is generally grounded in a subjective and interpretive perspective. However, while this is generally the case, it is not always so. Qualitative research supports an in- depth understanding of the situation investigated and, due to time constraints, it generally involves a small sample of participants. For this reason, the findings are limited to the sample studied and cannot be generalised to other contexts or to the wider population. Popular methods based on qualitative data include semi-structured or unstructured interviews, participant observations and document analysis. Qualitative analysis is generally more time-consuming than quantitative analysis. Quantitative data, on the other hand, might be easier to collect and analyse and it is based on a large sample of participants. Quantitative methods are based on data that can be 'objectively' measured with numbers. The data is analysed through numerical comparisons and statistical analysis. For this reason, it appears more 'scientific' and may appeal to people who seek clear answers to specific causal questions. Quantitative analysis is often quicker to carry out as it involves the use of the software. Owing to a large number of respondents it allows generalisation to a wider group than the research sample. Popular methods based on quantitative data include questionnaires and organisational statistical records among others. Depending on the research questions, we have used both approaches in this project. Generally, unstructured or semi- structured interviews produce qualitative data and questionnaires produce quantitative data, but such a distinction is not always applicable. In fact, language-based data can often be translated into numbers; for example, by reporting the frequency of certain keywords. Questionnaires can produce quantitative as well as qualitative data; for example, multiple choice questions produce quantitative data, while open questions produce qualitative data. Data has to be collected from all the wilayats across Oman, which will be used for further analysis. Data collected from various recent researches will be used for the purpose of understanding the usability of the system and the technologies.

### Framework

The basis of the AI tutoring system is based on the idea of individual assessment to reach a successful education, unlike traditional education that evaluates performance collectively. The purpose of this individual assessment is to create a special image of the individual through the performance of the individual and to provide materials suitable for his educational level in each subject (Malotky and Martens, 2016). The future of education can be

conceived as a space for sharing information on the Web so that each individual will be able to share and share ideas with others and to receive feedback from peers. This information will be available later and will benefit future generations.

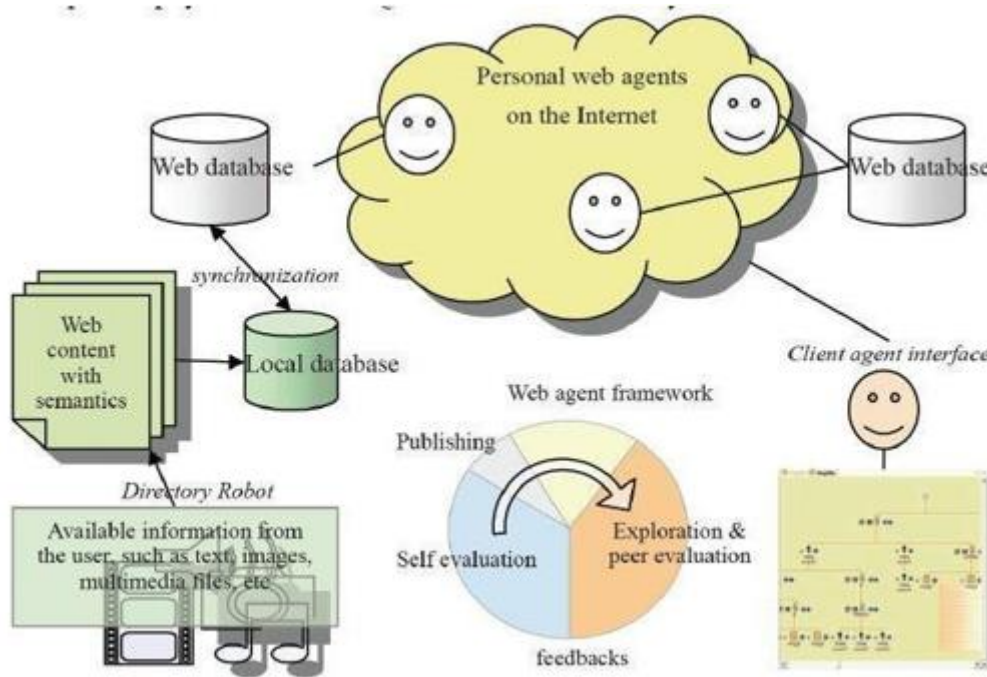


Figure 2 AI tutoring system Framework (Monique grandbastien 2013)

The process begins with self-evaluation so that the information is published and the web observer checks the information through the source. Visitors from other students can also give reviews of published information. However, based on the educational and psychological theories, peer reviews of the same specialization are often not honest because they will Give an excessive result and to solve this problem is the introduction of people from outside the article to give them their assessment and responses on the subject. One of the advantages of the proposed framework is that it combines many characteristics in terms of raising the user's personal level, providing discussion, dialogue, publishing, evaluation, and re-evaluation. In the end, the proposed framework is an informative system to complete the communication process between the school and the teacher and the materials studied through the program. Students are also encouraged to self-assess their information as well as verify the information through Feedback and the references.

## Objectives of the Project

What the world is witnessing today of the progress of the field of technology naturally impact on the teaching environment, and it has become necessary to keep pace with this progress to improve the educational level in the Sultanate of Oman Through the study of the statistics presented by the annual book of the Ministry of Education in the Sultanate of Oman for a period of four years, it can be noted that the stage that observed the failure of a large number of students in the completion of the tenth phase more than others in the stages, leads us to find that the reason behind this failure is the scientific materials Be more deeply at this stage.

If the application was implemented, it would have been possible to limit this problem and therefore the ability to predict the level of the dog through the performance of the store in the student modal and through the feedback by the receiver of the controller General Inspector and when analyzing all these data will give the student additional tasks for The rest of the village is able to overcome the danger and at the end avoidance of failure in the article that it is possible to lead to the full restoration of the academic year. This gives intelligent tutoring systems (González et al., n.d.) an advantage over other systems, their ability to diagnose as well as individual

diagnosis through the available data in the Student Modal and the best suggestion for each student according to their level and performance.

Also, through data stored for several years, artificial intelligence can use tools such as data mining (Jugo, Kovačić and Slavuj, 2016) through analysis, suggestions for the student's preferences, and what suits the Omani labor market. Because the machine can analyze what the human mind can not do then it is possible to build a path for the student to take care of each according to the tendency,

This artificial intelligence (Amastini, 2014) try to make man and build his mind. For when a human resource is strong in teaching that can compensate for the poor productivity of other resources, progress is not made by natural resources but by a man trained and equipped to challenge the future and its variables (Kularbphettong, Kedsiribut, and Roonrakwit, 2015).

### **This can be summarized in several points: -**

1. Repetition of a school year is a major loss to the individual and the government which could expose a person to a loss of instruction and thus becomes a burden on society.
2. The progress of nations and civilizations depends on successful education, here we review the use of modern technology in education.
3. This research will help me finish my MSc in Computer Science at the Middle East College and may help solve some of the problems of education in Oman.

These are the objectives of the proposed project:-

1. Identify the issues and challenges faced by students and influence their behavior, progress, and level of achievement in education. Explore the methods to improve students' motivation towards learning, especially male students.
2. Improve the skills of graduates in many materials, including science, mathematics, Arabic, and English with the help of an online platform.
3. To maintain consistency across the schools and facilitate the sharing of innovative methods of teaching.
4. To provide graduates with the skills of the modern era (the age of technology) (Nye, 2014) among these skills innovation, scientific research, solving dilemmas and analytical thinking based on facts and Figures and come out with a positive result.

### **Academic, Scientific and/or Innovation Significance**

The main purpose of the research is to inform action, to prove a theory, and contribute to developing knowledge in a field or study. This article will highlight the significance of research with the following points:

1. A Tool for Building Knowledge and for Facilitating Learning
2. Means to Understand Various Issues and Increase Awareness
3. An Aid to Educational Success

Research is required not just for students and academics, but for all professionals. "Knowledge" basically pertains to facts based on objective insights and/or study findings processed by the human brain. It can be acquired through various ways, such as reading books and online articles written by educators, listening to

experts, watching documentaries or investigative shows, conducting scientific experiments, and interaction with other people, among others. These facts can be checked to ensure truthfulness and accuracy. Academically it will help the future researchers to use this for application in many other areas such as success prediction and pass-fail rate ratio etc.

The proposed research will help to generate enthusiasm and interest amongst young children. The use of technology will help the administration to manage the sharable content for young students.

This is an effort to test the readiness of the students for the upcoming technologies and scale the effectiveness of the same. Technologically this research will help us to understand the real-life implementation of various tools and algorithms in the context of Oman.

### The initial design of the proposed system.

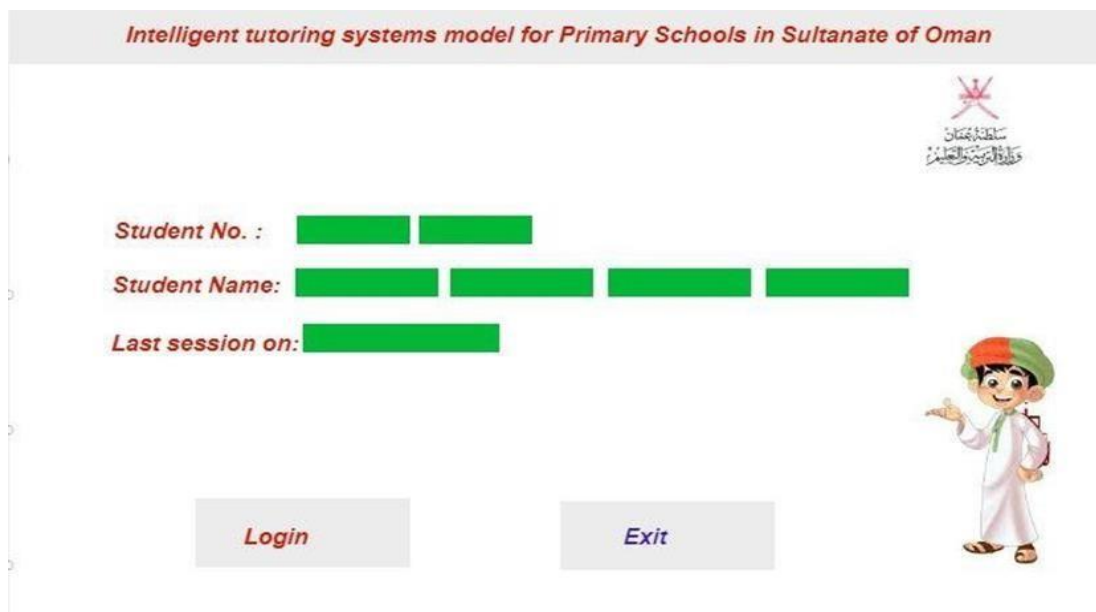


Figure 3 Initial design of the proposed system

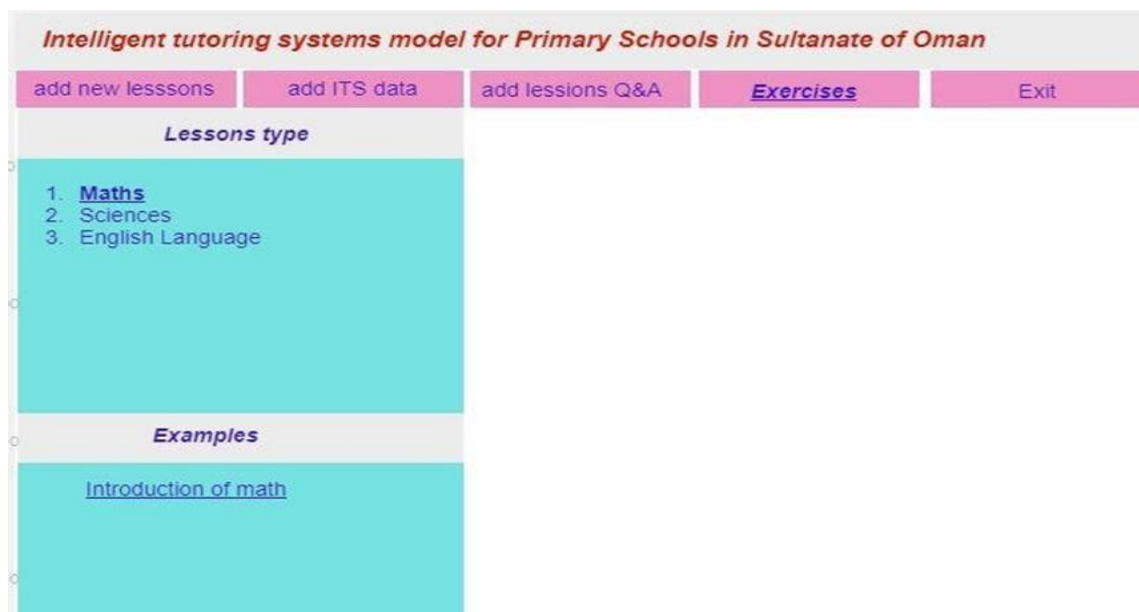


Figure 4 Initial design-2 of the proposed system

## CONCLUSION

An AI-powered tutoring system designed for the Omani primary school curriculum has the potential to significantly improve educational outcomes for students in the Sultanate. By personalizing learning, providing immediate feedback, and catering to diverse learning styles, AI can empower students and address learning gaps. Build a functional prototype of the AI tutoring system aligned with specific Omani primary school subjects and grade levels. Integrate culturally relevant content, examples, and explanations based on the Omani curriculum and the Ministry of Education's guidelines. Explore incorporating Arabic language support for a wider range of students and potential future integration of other languages spoken in Oman. Develop training programs for teachers on how to effectively integrate the AI tutor into their classrooms and leverage its functionalities to enhance learning.

For the future work we need to conduct pilot programs in Omani primary schools to assess the system's effectiveness in improving student learning outcomes, engagement, and teacher satisfaction. Also, gather user feedback from students, teachers, and parents to refine the system's interface, interaction design, and overall user experience. Continuously AI algorithms needs to be improved for personalized learning by incorporating student data and feedback from pilot programs. Conduct long-term studies to assess the impact of the AI tutor on student knowledge retention, critical thinking skills, and overall academic performance. Learning Style Adaptation: Research and implement AI capabilities to adapt the learning experience to different student learning styles (visual, auditory, kinesthetic). Explore integrating the AI tutor with educational games and simulations to further enhance student engagement and motivation. Develop features that allow parents to track student progress, receive recommendations, and actively participate in their child's learning journey through the AI tutor. Research and address potential ethical concerns surrounding AI in education, such as data privacy, bias in algorithms, and over-reliance on technology.

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