ABSTRACT

Education is facing various challenges at the moment and needs to be reinvented. Some of the methods used have been inspired by the industrial revolution when an assembly line one-size-fits-all approach was setup in schools. Today, teachers are struggling to manage the number of students in a class thus making the quality of teaching inconsistent. Furthermore, they have to deal with students having different abilities in the same class which makes it impossible to give each and every student the individual attention they deserve. Through the artificial intelligence assisted learning (AIAL) system, the authors believe that they can personalise the learning and thus free a lot of time for the teacher which can be used to focus on those students that are really in need. This will be done on a case by case basis, thus creating a fairer educational system which is personalized for the needs of each and every student which guarantees equity.

INTRODUCTION

Education is facing various challenges at the moment and needs to be reinvented. Some of the methods used have been inspired by the industrial revolution when an assembly line one-size-fits-all approach was setup in schools. Today, teachers are struggling to manage the number of students in a class thus making the quality of teaching inconsistent. Furthermore, they have to deal with students having different abilities in the same class which makes it impossible to give each and every child the individual attention they deserve. In most cases, students with low abilities might not get enough assistant to help them improve, whilst students at the higher end, do not get enough help to get them to excel. Furthermore, at the end of the day, teachers are swamped with never ending corrections which take away precious time.

DOI: 10.4018/978-1-5225-9304-1.ch020
which should be used by the teachers to improve the quality of their educational offerings. On the other hand, students might find their class boring when compared to the exciting world of tablets, gaming consoles, etc. They are not excited when faced with resources or methodologies, some of which have not been updated for years. The amount of work given to them, both at school and at home, might be either too easy or overwhelming for some. The situation gets even worse when these children have no one to refer to at home for assistance. Finally, when faced with the dreaded exams, some of them tend to panic and fare badly.

Because of this, we are proposing an Artificial Intelligence Assisted Learning (AIAL) System which manages most of these concerns. The system is preloaded with ready-made curricula based upon what is required by national governments. Teachers are also welcome to add their own material to the system. When a teacher delivers a lesson, she simply instructs the system to give the class an exercise on a particular topic. The system will then check the profile of every individual child and give him (on his personal electronic device) a tailor made exercise which is neither too easy, nor too hard. Furthermore, if the child gets stuck, the system will assist him with supplementary explanations inbuilt in the system. The level of explanations can also be tuned to match the abilities of the student. At the end of the exercise, the system automatically corrects the worked exercises and provides immediate feedback. These exercises form part of a continuous assessment methodology implemented through the system. This avoids the students from undergoing a final exams (since all the information is being gathered throughout the year) and it also feeds the AIAL analytics which can be used by the teacher. Through the analytics module, the Artificial Intelligence (AI) will also predict and flag students which will be facing issues in the following weeks so that the teacher can intervene on them directly. The same methodology can also be used at home, where the homework is automatically generated by the system and appropriate explanations are provided to help the student get through it. Furthermore, gamification elements will be implemented in order to get students to do more work whilst enjoying themselves.

The basic system can be seen in Figure 1. The system administrator is the person responsible with setting up the system. He is the person who populates the student’s Database and makes used of the Blueprint Designer in order to design the class of questions which are going to be given to the students together with possible solutions. The teacher’s dashboard is the interface seen by the teacher. Through this dashboard, the teacher can either schedule work for the students or have a look at the various analytical reports. The work schedule is used for both class and home work. The teacher does not need to specify the actual problems but only the class of problems. Then it is up to the AI to decide what problems to generate and how many (based upon the abilities of the child). Furthermore, the teacher has access to various analytical reports which outline the performance of the students in a class and he can also drill down to the individual performance of each and every student. The dashboard will also alert if a student is having problems with a particular topic in order to prompt the teacher’s intervention if necessary. The student’s dashboard is the main interface between the student and the system. Each student will download the work assigned to him via the profiler. The dashboard will then invoke the AI in the Problem Generator which will generate the actual problems together with their solutions. It will also invoke the Gamification Engine in order to gamify the learning experience. The student will then work the exercise generated from the system. If the student is faced with a problem, he can ask the system to provide him with an explanation. This can include a step by step guide or even a video lecture. The AIAL will then correct the exercise on the fly and provide the student with additional feedback which might include a new explanation in order to teach him how to solve a particular task or even additional exercises to polish his skills.