"Learning Steps" An Innovative Teaching Technique Implementing STEM-AI Protocols

Preetam Kumar Panda[*], Prateek Kumar Singh[**], Capt. Shweta Singh[***]

[*] Department of Science & Technology
[**] Delhi World Public School, Raigarh

DOI: 10.29322/IJSRP.10.01.2020.p9746
http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9746

Abstract- Learning is maximized when children are engaged in the process of learning. If 'fun factor' is added to it, it becomes all the more interesting. Basically, teaching must include two major components viz. *sending* and *receiving* information. Overall, a teacher tries his/her best to transmit knowledge in the way he/she understands it. Hence, any method of communication that serves this purpose, keeping the objective intact, can be considered as innovative method of teaching, and our project is based on this concept only. In the process of continually enriching the quality of education we endeavor to impart, we have set the objective of our project i.e to make Learning highly efficacious. Our project was conceived for the school to develop creative thinking and innovation in the next generation. And what better way to do this then "Lead by example". On successful implementation of this project, it has been found that the pupils in our school show a great deal of interest and enthusiasm in conceptual learning.

Index Terms- Learning Steps, Education, Audeno, Learning is Fun.

I. INTRODUCTION

With the gradual ushering in of the digital era in every walk of our life, it becomes a moral responsibility of the schools to implicate digital and online tools into the learning process. This article guides a stepwise walkthrough of our new innovative learning methodology which enables the concept of *Learning is Fun*. Project *"Learning Steps"* is a very helpful tool for children to easily understand and memorize difficult topics in sports and fun. Through learning steps, many other essential concepts/fundamentals can be taught to young children easily and recreationally. Further, it becomes a medium of skill development in children where we can make education more viable and enjoyable as well. This project incorporates the basic concepts of Artificial Intelligence and STEM ("science technology Engineering and Mathematics"). The learning steps tool is made up of ultrasonic sensors, Audino microprocessor and other electronic and electrical parts, which in itself is a complete learning tool. The learning steps have 12 Ultrasonic Sensors for 12 stair-steps. That have been connected to the microcontroller, and when the children go to the steps, the rays emanating from the feet reach back to the ECHO sensor which carries a current of 5 volts to the microcontroller and the basis of corresponding C++ program installed in the microcontroller enables DF Player to play particular sensor's music file. Thus, the tune plays and the children learn to the tune of music.

II. RESEARCH & IDEA

The role of technology in education:-

Learning with technology has become essential in today's schools. Worldwide, governments, education systems, researchers, school leaders, teachers and parents consider technology to be a critical part of a child's education. In Australia, it is acknowledged that advances in technology have an influence on the way people create, share, use and develop information in society, and that young people need to be highly skilled in their use of information and communications technologies (ICT). This educational aspiration is a cornerstone of the Melbourne Declaration on Goals for Young Australians (MCEETYA, 2008) and ICT competence is realized as one of the general capabilities in the Australian Curriculum (ACARA, 2011). Developing students' knowledge and skills related to ICT in the school years provides an important grounding for later stages in life. It also provides equity of opportunity, regardless of background. General social commentary and the popular press tend to generalize about young people, their access to and use of technology. Recent literature have challenged these assumptions and acknowledge that, although students today may have been born into a technologically rich world, they may not be avid and skillful users of technology (Bennett, Maton & Kervin, 2008). Meaningful development of technology based knowledge and skills is important for all students, in order to avoid a phenomenon known as the 'second-level digital divide', whereby people have drastically differentiated skills, which in turn influence how people participate in society (OECD, 2010).

Learning with technological tools:-

The contemporary curriculum guides teachers to facilitate the development of adaptable and flexible learners who know how to take on new tasks and situations, quickly and easily. Students will need to be good communicators who can competently discuss topics with others and effectively share their ideas in many forms and for different purposes. Students will need to possess excellent collaboration skills and be able

to work together with many different types of people, each of whom has her or his own special disciplines and unique ways of learning and working together. Furthermore, students will need the ability to create in a variety of manners and bring their visions and ideas alive through different types of media. In this section, we discuss the ways in which students can learn to understand, communicate, collaborate and create using different modes of technology, and how teachers can use technology to assist their students in transforming knowledge and skills into products, solutions and new information.

III. STUDIES AND FINDINGS

When we make any innovative learning tool it should justify following principals:-

- ***Learners have to be at the center of what we are making*** with activities focused on their cognition and growth. They have to actively engage in learning in order to become self-regulated learners who are able to control their emotions and motivations during the study process, set goals, and monitor their own learning process.

- ***Learning is a social practice and can't happen alone***. "By our nature we are social beings and we learn by interacting," Groff said. "We learn by pushing and pulling on concepts with one another." Structured, collaborative group work can be good for all learners; it pushes people in different ways.

- ***Emotions are an integral part of learning***. Students understand ideas better when there's interplay between emotions, motivation and cognition, so positive beliefs about oneself are a core part of reaching a more profound understanding. The power of emotions and motivation in the classroom are well documented, but often overlooked because they are "soft." Still most teachers know that if a student is upset about something that happened at home or in school, he won't learn well. Similarly, keeping students motivated should be the starting point of learning. If students understand why it matters, learning becomes more important to them.

- ***Learners are different*** and innovative learning environments reflect the various experiences and prior knowledge that each student brings to class. "You really want practices and processes that help teachers engage each student where they are," said Groff. This principle is understood by every frustrated educator teaching to a "middle" that doesn't exist.

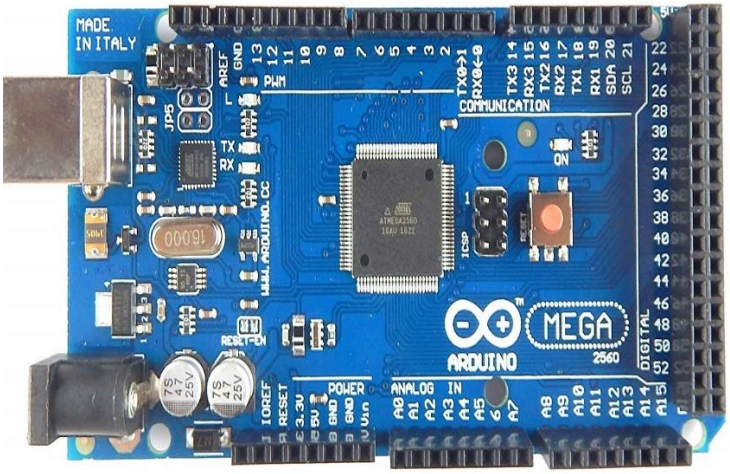
- ***Students need to be stretched, but not too much.*** "It's really critical to find that student's sweet spot," Groff Said. Educators should try to prevent both coasting and overloading. Students need to experience both academic success and the challenge of discovery. In a diverse classroom group work can help achieve this as students at different levels help one another.

- ***Assessment should be for learning, not of learning***. Assessments are important, but only to gauge how to structure the next lesson for maximum effectiveness. It should be meaningful, substantial, and shape the learning environment itself. "Good teachers do this informally most of the time," Groff said. "But when it's done well and more formally it's a whole structure and methodology where you collect feedback on the learning pathway and it drives the next step that you take."

- ***Learning needs to be connected across disciplines*** and reach out into the real world. Learning can't be meaningful if students don't understand why the knowledge will be useful to them, how it can be applied in life. Understanding the connections between subjects and ideas is essential for the ability to transfer skills.

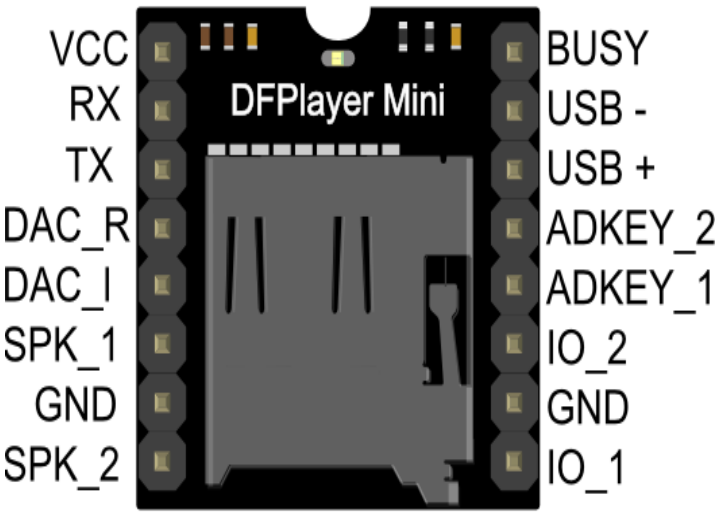
IV. METHODOLOGY

Arduino mega 2560:- Arduino is an open source programmable circuit board that can be integrated into a wide variety of projects both simple and complex. This board contains a microcontroller which is able to be programmed to sense and control objects in the physical world. By responding to sensors and inputs, the Arduino is able to interact with a large array of outputs such as LEDs, motors and displays. Because of its flexibility and low cost, Arduino has become a very popular choice for makers and makerspaces looking to create interactive hardware projects.



DF player mini:-The DFPlayer Mini is a small and low cost MP3 module with an simplified output directly to the speaker. The module can be used as a stand alone module with attached battery, speaker and push buttons or used in combination with an Arduino UNO or any other with RX/TX capabilities. The DFPlayer perfectly integrates hard decoding module, which supports

common audio formats such as MP3, WAV and WMA. Besides, it also supports TF card with FAT16, FAT32 file system. Through a simple serial port, you can play the designated music without any other tedious underlying operations.



Ultrasonic sensor: - Ultrasonic sensors work by transmitting a pulse of sound, much like sonar detectors, outside the range of human hearing. This pulse travels away from the range finder in a conical shape at the speed of sound (340 m/s). The sound reflects off an object and back to the range finder. The sensor interprets this as an echo and calculates the time interval between sending the signal and receiving the echo. This interval is then computed by a controller to determine the distance of the object.

Amplifier Unit: - An amplifier is a circuit that receives a signal at its input and delivers an undistorted large version of the signal at its output, it is used to amplify the weak signal without changing any information means strengthen or boost the weak signal without changing any input or information. Negative feedback is used in amplifiers. Because of decreasing the gain of the amplifier.

V. CONCLUSION

The concept of Learning Steps, if incorporated into curriculum as highly effective TEACHING AID for all subjects especially at the Pre-Primary, Primary and Middle-School level, will certainly enable the Stake holders and the Associate Stake holders of all the schools to lay the desired foundation of scholastic ability among the students who can undoubtedly excel in their higher studies, and also carry further the concept in a more innovative way. Also taking cognizance of the fact that our children are becoming more and more susceptible to easy life style, this would intend to generate love for physical activity, as simple as climbing stairs, among children.

Success is a journey, not a destination.

VI. REFERENCES

Michelle J. Eady & Lori Lockyer (2013) **Tools for learning: technology and teaching Strategies.** *University of Wollongong, meady@uow.edu.au*

Katrina Schwartz (2013) **7 Essential Principles of Innovative Learning.** *https://www.kqed.org/mindshift/26755/7-essential-principles-of-innovative-learning*

Atkinson, R. C. & **Shiffrin, R. M.** (1968). Human memory: A proposed system and its control processes. In K. W. Spence & J. T. Spence (Eds.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 2, pp. 89–195). New York: Academic Press, Inc.

ACARA (Australian Curriculum Assessment and Reporting Authority). (2011). *The shape of the Australian Curriculum, Version 3*. Sydney: Australian Curriculum Assessment and Reporting Authority.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Cuban, L. (2003) *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.
Agnew, P. W., Kellerman, A. S. & Meyer, J. (1996). Multimedia in the Classroom, Boston: Allyn and Bacon.

Boud, D. & Feletti, G. (1999). The Challenge of Problem-Based Learning, (2nd Ed.), London: Kogan Page.

Hofstetter, F. T. (1995). Multimedia Literacy, New York: McGraw-Hill.

Dunn, Philip (2001) Interpretation of Accounts. Uk, Student Accountant January 2001

Preetam Kumar Panda received the M.Sc. (Chemistry) defree from Guru Ghasidas University Bilaspur , B.Ed. from Sarguja University, Ambikapur, CTET qualified and Currently Working as TGT Science at Delhi world Public School, Raigarh (C.G.)

Prateek kumar Singh received the M.Tech degree in Comuter Science & Engineering from the LNCT, Jabalpur, India, and Currently Working as TGT Computer Science at Delhi world Public School, Raigarh (C.G.)

Capt. Shweta Singh received Masters Degree in History and Bachelor degree in Education and guided the project as Principal of Delhi world Public School, Raigarh (C.G.)