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Early Curriculum for Artificial Intelligence (Ai) Enhancing the Quality of Education

Dr. Tr. Kalai Lakshmi[1], Dr.M.Sudha Paulin[2], Dr. Kannan.N[3]

[1]Associate Professor, School of Management Studies, Sathyabama Institute of Science and Technology Chennai, TamilNadu, India
[2]Assistant Professor, School of Business and Management, Christ University, Bengaluru, Karnataka, India
[3]Professor, School of Management Studies, Sathyabama Institute of Science and Technology Chennai, TamilNadu, India

Corresponding Author: Dr. Tr. Kalai Lakshmi (kalailakshmip@gmail.com)

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Abstract

With the rapid advancement of AI technologies, demand for people to be AI literate will explode in the near future. Therefore, it is necessary that this new generation of citizens should be equipped with AI competencies and instructed how to effectively use AI in practice. All such efforts made so far have focused on the education of AI for both secondary schools and universities and left an important gap in exploring the methods to teach AI as part of early childhood education. As AI education for kindergarten differs from secondary and higher education in general this study is an effort to integrate a framework to introduce AI education in the kinder garden curriculum study. We as advance attainment of AI literacy along focus on three core competencies as AI Knowledge, AI Skills, and AI Attitudes and inclusion of AI tools such as social robots into learning companions has been positive as using such companions helps young children understand the foundational AI principles. The present study reveals the best teaching methods for improving a student's learning experience in AI education. This paper discusses on the inclusion of a framework in school education which can address four major components of the curriculum as the aims and objectives of including AI education in Kinder Garden education, subject content to be included for kinder garden students in AI education, instructional methods and procedures and evaluation or assessment techniques to be implemented for enhancing the quality of education.

Keywords: Artificial Intelligence, AI-Education, Curriculum Development, K-12 Education

INTRODUCTION

Artificial intelligence, broadly defined as "the science and engineering of creating intelligent machines," is an important and rapidly growing area of computer science. Indeed, it includes topics such as machine learning, algorithm design, and natural language processing. Yet to this point, far greater attention has been given to AI development at secondary and university levels than to kindergarten-level curricula [1]. Today's children are surrounded with AI technologies which provides them access to a host of tools boasting processing power many thousands of times greater than personal computers which were used by early generation kids just ten years ago.

Recent studies have focussed on AI early childhood education, indicating that children could learn AI with interactive tools and exposure to knowledge-based systems as well as supervised machine learning. Yet, the literature has not been good enough in providing structured AI curricula for early childhood education. Evidently, therefore, AI education for kindergarten differs from secondary and higher education in general, where the latter is often targeted at programming and complex concepts. In contrast, AI early education focuses on fundamental principles and very simple AI activities [2], such as drawing concept maps. The inclusion of AI in kindergarten curricula is important for enhancing computational thinking and problem-solving abilities and improving AI literacy overall for young learners. Interacting with AI robots also enhances literacy skills in inquiry, including creative and collaborative inquiry. AI education should, therefore, be prioritized during early childhood.

The best definition of the term "curriculum" is all direct and indirect experiences, activities, and events planned to promote learning and development in children. A well-articulated curriculum usually encompasses four dimensions: goals or objectives, content or subject matter, methods or procedures, and evaluation and assessment. High-quality early childhood education has

been shown to have beneficial impacts on children's educational outcomes and on their relationships with teachers [3]. As a result, many governments and policy makers worldwide have reacted by making computation and computational thinking a part of curricula starting at the earliest grades.

However, it is now an avalanche of research findings that confirms that coding and programming apps indeed improve these computational thinking abilities to reason and communicate in increasingly digital environments. The peculiar landscape of computational participation throws up a rather important point that students code not for the sake of coding but to develop shareable games, stories, and animations in programmable toys and tools far beyond traditional screens. While early research on AI education might be helpful in terms of cognitive, intellectual, and social benefits to the child, there is much that the proposed strategies recommend to teach such concepts to young children. As such, we recommend that problem-based learning approach be incorporated into pedagogy to promote critical thinking, problem-solving, and collaborative skills among the students. Early childhood AI curricula require immediate systematic design, including teaching methodologies, assessment frameworks, and future directions to improve educational quality and enhance the efficacy of curriculum management in the context of AI.

2. BACKGROUND OF THE STUDY

2.1. Availing AI education principles

As AI deepens the core of society, its tremendous success depends on the present education system and curricula. AI is omnipresent and spreads its impacts horizontally across industries. There is a intensifying demand for AI-literate humans is all the fields of business .This permanently escalating need for AI educated employees necessitates schools to provide students with AI skills and competencies to perform well in an intense world which is relying on technology (Preface, 2021). Thus, to be up-to-date and accessible to good quality education, AI-driven solutions need to be integrated into educational institution curriculum management strategies. It is not only an instrument of improving employability, but a tool that strategically improves the quality of education and attracts prospective students [4].

India, China, the United Kingdom, Thailand, Korea, and EU countries are all making progress in AI education, with attempts to standardize AI learning at various levels. This trend has a double effect on institutions of learning: on one hand, this improves the quality of education because of the exposure of students to the state-of-the-art technology and on the other hand, as an advertising tool since these institutions is touted to be modern and involving. Organizations such as AAAI (Association for the Advancement of Artificial Intelligence) and CSTA (Computer Science Teachers Association) have worked together to generate guidelines for teaching AI to K-12 students. K-12 education is the educational system that includes kindergarten through 12th grade. Simultaneously, curriculum policies can align with the AI for K-12 recommendations at ai4k12.org. Schools can then promote themselves as entities at the forefront of 21st-century education [5].

The AI for K-12 framework offers an opportunity for schools to report on curriculum revisions while deepening an investment in learning that is ready for the future. Five Big Ideas of this framework—Perception, Representation and Reasoning, Learning, Natural Interaction, and Societal Impact—can become central features when curriculums are built in demonstrating educational quality. The same would be the case of the concept Perception, for example, where the appreciation of the kind of interpretive mechanism of AI systems in interpreting sensory inputs through speech recognition and computer vision is taught to students. From a marketing perspective, this is the kind of information that can be reflected upon by parents with tech-saviness while advertising or marketing the school and its curriculum and abilities as preparing their children for a high-tech future [6].

Incorporating AI-related activities and tools such as Scratch plugins or Calypso in the course curriculum will enable schools to train students practically while enhancing student engagement and differentiating it from others. This enhances the academic ranking of the institution while enhancing its ranking within the education market. In comparison, curriculum effectiveness can be tracked and optimized using AI-driven data analytics to enhance student performance and reputation of the institution. The schools which take proactive initiatives by introducing AI concepts at younger ages will have the opportunity to differentiate themselves in the education market. Similarly, now there is a growing demand for making systematic efforts toward designing AI curricula for early childhood education because it will work as a USP for schools.

2.2. AI Education

AI education goes beyond computational thinking to the sensing of computers, the thinking of computers, the action of computers, the learning by computers, and decision-making by computers-basically essential tools for today's students to learn. In curriculum management, the inclusion of AI education augments educational quality while otherwise giving an edge in the education market [7]. This means that schools are well-equipped with a strong marketing storyline in presenting to parents and students this need for future-ready learning environments once students experience the world as AI can create, perceive, and make sense of it. Young children would especially appreciate STEM education in an active learning fashion since they think in concrete terms; therefore, AI education would be very appealing

to early curriculums. It will be a chance for schools to distinguish themselves from others by providing forward-looking learning experiences as long as they see an opportunity to start introducing AI to their 3-year-old students. Introducing AI at the foundational level with fun and interactive resources strengthens curriculum rather than merely interesting the timetable and stands schools on the verge of pioneers as they prepare children for a tech-driven world recommended a curriculum framework for early childhood education to ensure that early learners gain AI literacy in three broad areas, namely helping kids distinguish AI technologies in their daily lives, providing them with basic programming skills to interact with AI technologies, and raising awareness about the moral dimension of AI.

All such entities might be incorporated into the curriculum to provide wholesome AI education that fosters AI knowledge, AI skills, and AI attitudes at an early age. It also works as a great tool in attracting families valuing innovation and future-readiness in their educational choices [8]. Parents would probably be attracted to schools that are proactive to address the future needs of students, especially when AI skills are perceived as being integrated into success in tomorrow's workforce. A school would improve its quality of education and garner an edge in a highly competitive market for education by doing so effectively. This makes sure that their students are ready for the future by developing AI literacy through experience and ethical discussions. Introduction of AI-driven education in schools is an opportunity for children to shine in STEM and AI-related fields in future and would ultimately give strength to their brands and reputation as leaders in modern education.

2.2.1. AI knowledge

The inclusion of AI Knowledge in curriculum in early school education may not only improve the quality of education but also effectiveness in marketing strategies for educational institutions. AI knowledge enable learners to learn the basic concepts of artificial intelligence and school to focuss on improving students' learning outcomes and give them a clear vision and also well equip them for future technological challenges.AI Knowledge competency falls into five clusters that can well be woven into the curriculum to exhibit commitment by the institution to providing front-edge education: 'Definitions and Types of AI,' 'Problem-Solving and Search,' 'Reasoning,' 'Data and Machine Learning,' and 'Applications.' Each one of these clusters allows an opportunity to raise quality of education while positioning the institution as an innovator in AI education.

- Definitions and Forms of AI: This kind deals with the differences between AI-led systems and algorithm-led systems. Exploring such differences might help them better understand what AI does in general with current technologies. In marketing terms, to sell the curriculum based on clear demarcations of AI from algorithms proves to the school students that the education system genuinely cares about teaching relevant high-level education, an appeal both to parents as well as to the students towards the future of technology.
- Problem Solving and Search: This ability exposes the student to the techniques of search and the problem-solving methods that are used in AI. To enhance the richness of the curriculum, schools might need to direct the student to how an AI system goes about solving complex problems. Advert programs that will promote this aspect underscore how the institution focuses on these skills, highly sought in critical thinking, as it presents itself as a training institution with a competitive edge in the education market.
- Reasoning: It explains the logical reasoning of humans by using a computational model. This concept introduces how AI imitates processes in the human brain to a student, which makes the curriculum more whole. From a marketing perspective, this can be used to market the school's curriculum as sophisticated, forward-thinking, and capable of preparing students for work in AI, cognitive science, and robotics.
- Data and Machine Learning: This competency category deals with understanding the machine learning algorithms and how algorithms can detect patterns in data. Data analysis and machine learning can bring a great improvement in school quality if introduced in curricula, making students productive members of industries whose reliance on AI increases day to day. Marketing will be the reflection that schools are interested in providing prospective students and their parents with experience content that matches current dynamics in different industries.
- Applications: The Applications cluster allows students to see AI in action. Within this area, applications include computer vision, speech recognition, or machine translation. Voice recognition and optical text recognition are hands-on activities included within the curricula of schools so that students can practice real-world applications. Highlighting these application-based activities through marketing by the school can result in a better reputation of being an institution that allows experiential learning to prepare a student for AI application in industry.AI knowledge integrated strategically in the management of the curriculum by education institutions can significantly improve the effectiveness of marketing. This is educating the students for

their future career while positioning the school as a leader in innovative and technological learning. This can be marketed as having the chance to lead ahead of the curve with AI and related technology learning competencies.

2.2.2. AI skill

In addition, the introduction of AI skill competencies into curriculum management would prove important in enhancing both educational quality and marketing effectiveness. While having AI skills, students also have a level of programming ability that is of current necessity in today's tech-driven world. Thus, proper attention to these skills would produce modern and dynamic curricula that attract greater numbers of potential students and parents seeking education for the future.There are two critical competencies that can be developed in the curriculum by institutions - 'Use of AI Tools' [9] and 'Computational Thinking and Programming.' Both competencies provide strategic benefits in terms of both quality improvements in education and marketing of an institution as an innovator in AI education

- Use of AI Tools: The students will understand and apply skills by solving problems with the appropriate use of AI tools. In this way, schools empower students to merge technology with real-world problems and improve their problem-solving skills and practical knowledge. As a marketer, the use of AI tools makes the school sound progressive-orientated. It allows families to have their future-ready education in these institutions.
- Computational thinking and programming: This ability encompasses developing simple AI applications and, at the same time, supports students' development in computational thinking. Mentioned that the AI competence framework of Ready AI supports both computational thinking and programming skills. Computations thinking has been identified by Wing as the student's ability to "analyse and solve problems, design systems, and understand human behavior in terms of principles from computer science" 2006. Integration of this ability in the school curriculum will develop this critical and analytical thinking in a world fast becoming computationally important.

The other way through which teaching computational thinking and programming enhances quality and becomes a powerful marketing hook for educational institutions is that schools showing an emphasis on these skills can show an intent to prepare students for the future generation of workers, specifically those studying fields related to AI and computer science. The focus can make it different in a competitive education market while showcasing the art of AI, literary competency in AI requires developing computational thinking competencies for students. Curricula that incorporate these competencies will assist in better s

Figure 1: AI in curriculum planning

Student outcomes and ensure that students are being educated toward a well-rounded, future-ready education as depicted in figure 1. Further, market publicity that exemplifies institutions' efforts to utilize their educational settings to cultivate computational thinking and programming for their students can more easily bring families to a school when they value advanced technological education [10].

2.2.3. AI attitude

Hence, the capability of AI Attitude makes students think more critically about broader social implications of artificial intelligence. Second, the incorporation of the capability into management of the curriculum improves education quality while enhancing the market position of the institution: due to the display of commitment to responsible, ethical education in AI. Equipping the student population must consequently incorporate cultivating a balanced understanding of its impact on society, in order for them to be equipped with the tools they will navigate and possibly contribute to in the AI-driven world as AI increasingly influences decision-making processes across industries.

AI Attitude competency focuses on two primary components: 'Social Impact' and 'Collaborate with AI'. Both of these components help students focus positively and negatively on the effects of AI, develop a critical view of its applications, and learn to use it for good. Putting strong emphasis on attitude toward AI in the curriculum can thus enhance educational quality by illustrating both ethics and responsibility in the use of AI. The same basis also gives a good ground for marketing the institution as a vanguard in advanced thinking, values-based education.

- Social Impact: This field nurtures helping students comprehend the wide-ranging implications of AI on society. AI can be an immense innovation driver but raises various ethical issues, particularly with respect to children's rights, privacy, security, and safety. For example, AI is mostly ignored in discussions around children, and the consequences of AI fortheir rights are often side-lined (AI for Children, 2022) [11]. It is through discussions of such matters that schools may well be able to provide students with a well-rounded education not only on the technical aspects but also on the social and ethics dimensions of AI. Thus, by focussing on this aspect, there could be an influx of parents and students who would like to see values implemented at the heart of the educational process.
- Work with AI: In this regard, demonstrate in what ways students can work alongside AI technologies, in an appropriately collaborative, ethical manner. On the other hand, knowing how to employ AI responsibly in interacting with it opens a gate for teaching students how to apply it better for social benefits. However, there are also several types of risks: the commercialization of gender-biased AI systems or even racial stereotypes embedded within AI algorithms. Teaching students about risks would mean schools could market themselves as institutions that not only discuss the use of AI in everyday life but also that the individuals who pass through them are exposed to at least basic knowledge about the ethical issues involved.

These AI attitude competencies embedded in curriculum management enhance the quality of education for students with a balanced perspective on the ethical and societal aspects of AI. The students are nudged to delve deeper into the conflicting ethical issues of AI and explore other peoples' views. This balanced view develops critical thinking and equips them to make informed choices regarding AI use in society.

In contrast, the issue of ethics related to AI acts as a perfect marketing hook when centered around competent instruction. The various educational institutions are distinguished with respect to a responsible AI education as they demonstrate their dedication to protecting this industry through the ethical use of technology.

2.3. Tools and resources for AI at the higher education level

Thus, the incorporation of assistant tools in the process of designing the curriculum shall be an integral strategy to make students and teachers at K-12 learn and study about AI and its core concepts. These tools not only improve the quality of education but also market the schools as innovative and future-oriented providers of education. Now, with young students coming of age through participation in AI tools and techniques, institutions can be ready to position themselves as leaders of the AI education curriculum that is sure to meet the demand for future-ready skills [12].Also noticed that a sufficient number of AI tools and resources are in existence to be utilized for the engagement of learners and instructors, offering hands-on learning which is primary for understanding in AI knowledge. These tools are not only indispensable for enhancing the educational process but also as a means of advertising and differentiating educational offers while marketing educational programs. The utilization of such tools in managing the curriculum assures competitiveness within the institutions in a world dominated by technology.

The tools available include:

- Cognimates: Scratch add-on that brings speakers, voice generators, speech recognition, object identifiers, and robot control applications. Using this tool in the curriculum

will make the AI world come alive for students, an essential factor in attracting those with a futuristic bent of mind and their parents. https://cognimates.meeCraft2Learn (Kahn & Winters, 2017): A Snap! extensions set that developed from Scratch and allow students to learn AI through hands-on programming activities. https://ecraft2learn.github.io/ai/.

- Machine Learning for Kids: The website has interactive demonstrations that allow students to train classifiers using web applications or Scratch extensions; this makes AI learning accessible and entertaining. https://machinelearningforkids.co.uk/
- Cozmo robot: ultra-low-cost robot with on-board computer vision that includes face recognition, path planning, and object handling. Learning with Cozmo can make AI studies experience vibrant learning and make improvements both to educational outcomes and branding the school as one of the institutions to innovate in tech education.
- Calypso for Cozmo (Touretzky, 2017): a visual programming language for students to be able to develop applications with AI and Cozmo, such as voice recognition and navigation. https://Calypso.software
- Google AI Experiments: Free AI experiments like "Teachable Machine" and "QuickDraw" facilitate hands-on activities in neural networks and machine learning for students to make AI fun and interactive. withgoogle.com/collection/ai Therefore, incorporating these tools into curriculum management through AI will enhance the education experience but open other avenues to effective marketing. It will make schools more attractive programs that will sell to a prospective student or his/her parents desirous of institutions that are ready to prepare their children for the future.AI Curriculum and Computational Thinking [13] developed a taxonomy of computational thinking in mathematics and science that will further be enhanced in the design of the AI curriculum. The taxonomy is comprised of:Data Practices: Involving students in activities involving collection, analysis, and visualization of data.
- Modeling and Simulation Practices: Engaging students in using models to understand ideas and find solutions, thereby getting closer to the science of AI. Computational Problem-Solving Practices: Teaches the students how to prepare the problems for computational solutions, programming AI-driven applications, and assessing various different solutions—essential skills in the modern tech landscape.
- Systematic Thinking: Forcing students into questioning complex systems from all perspectives, which is a critical part of understanding AI's societal impact. Such practices in AI curriculum management enable schools to provide students with a rich, comprehensive education that surpasses the traditional classroom experience. In addition, it is one of the best marketing advantages, which helps link the institution to renewed efforts toward STEM education and future skills.

AI Curriculum for Early Childhood Education Although most of these tools and curricula seem to be for use with older students, the need for standardized AI curricula is emerging in ECE. Even though the AI curricula that currently exist for preschool children target issues such as knowledge-based systems, supervised machine learning, and generative AI, their complete conceptualization, their implementation, and how these curricula were appraised and evaluated are still lacking for the younger children. It is proving education quality, along with a unique marketing edge in this regard, where schools can use it as a differentiating factor by providing AI literacy from an early age. Being proactive in preparing and promoting AI curricula for ECE, schools can become leaders in terms of education, with future-oriented curricula, and prepare children as early as possible to fully plunge into a world that is rapidly growing into an artificial intelligence-dominated one.

4. Framework for designing AI curriculum

Frameworks guiding curriculum development There exists varied frameworks guiding curriculum development that are built on different ideologies and approaches to educational design. One of the examples is sociocultural learning, where it places emphasis on the role of society and social interaction in the process of learning [14]. Instrumentalism focuses on the values or experiences that should be offered through the curriculum, while the scientific curriculum model underscores the application of scientific methods to study and structure the curriculum. However, what complicates extending those models to most curriculum management is that the difference in learners' needs and cognitive levels as well as contexts bring about difficulty. There is a need for a more applicable and standardized framework in the context of AI-enhanced curriculum management. Scott's (2008) framework on curriculum development focuses on how to effectively manage the AI design and implementation process vis-à-vis educational quality and marketing effectiveness.

This framework, appropriate for K-12 all the way up to higher education, consists of four key dimensions necessary to incorporate AI into curriculum management:

- Aims, Goals, and Objectives: These encompass defining desired ends either to better improve the quality of education or to achieve competitive advantage over education market

through the use of AI potential subject Matter, Domains or Content: It is the curriculum content that has been worked upon by AI, relevant, updated, and applicable to the contemporary learner aspiring to meet the institution's prestige.

- Methods or Procedures: This encompasses the AI-driven tools, methodologies, and techniques that are incorporated within curriculum delivery and instructional design management. AI can manage routine administrative jobs and offer very individualized learning experiences that will make both educational results and marketing more attractive.
- Evaluation and Assessment: These are ways to check how effectively the AI-facilitated curriculum management system improves the student's learning outcome, teaching technique, and hence the overall marketability of the institution.

5. Curriculum design, assessment and implementation for AI in early childhood education

5.1. Content and activities

Curriculum design for AI-enhanced curriculum management has four key modules and lesson objectives. In that regard, these modules are to exploit AI technologies in order to enhance educational quality and effectivity in marketing. Several researchers have talked about teaching AI concepts. For instance, knowledge-based systems, supervised machine learning, and generative AI. One example of teaching AI concepts is through tools such as PopBots [15-18]. The reasons why there is a need for integration of AI in managing curricula are the enormous effects of improvement in critical educational outcomes and particularly the students' essential skills, like problem-solving and critical thinking skills, for success both in academics and preparation for further workforce. Also, AI-based learning modules allow individualized experiences, efficient administrational processes, and a good reputation in the education market.

5.2. Classroom materials

The proposed early AI curriculum package shall be complemented by full classroom materials, such as lecture slides, students' workbooks or worksheets, and a teacher's guide or guidebooks. The lesson plans for each module are written clearly on their objectives, required materials, foundational knowledge, engaging activities, and relevant rubrics on what to look for in student responses to assess better for understanding.

For the class teacher, especially when they have little or no experience with concepts such as AI, the guide from the supporting teacher is of immense value; to them not only does it offer alternatives toward instructional strategies but also, to a large extent, reduces the work that needs to be done about lesson preparation (Sabuncuoglu, 2020). This guide provides information on successful teaching methods and practice for the inclusion of AI themes in learning.

The student workbook is considered a learning tool that is comprised of various aspects to be used to facilitate learning for the student to ensure understanding and the development of knowledge and skills as stated in the curriculum. It is hence meant to guide experiential learning that suits the aims of the program. In response to such goals, the curriculum offers these structured materials in order to upgrade the quality of education as well as equip instructors with the right tools to successfully market their AI-centric programs, making them more attractive to students and parents alike [19].

5.3. Curriculum theme

Table 1 proffers the proposal for AI's actual content to be used in kindergarten for children aged 3-5. The curriculum should remain child-centered, and designed to embrace different levels of understanding. The early curriculum should introduce somewhat set ideas from rather simple to very complex ones, that promises to cover in full throughout the learning process with the intent to developing their critical thinking and problem-solving skills.The course is structured into four modules. There are very organized and engaging activities that culminate in a hands-on project. Being modular makes it easy for the facilitators to market this curriculum since this curriculum is quite flexible, and the children get valuable skills in the course of the program. This is an AI curriculum aimed at being able to help children explore more about artificial intelligence so as to enhance the quality of education with a better understanding of artificial intelligence.

5.3.1. Considerations for module design

The early AI curriculum modules were therefore devised based on very fundamental considerations that focus on aspects of the competencies developed in children across diverse skills. Consequently, each module is so designed to install foundational knowledge in AI with interesting activities that bring out critical thinking, creativity, and problem-solving abilities. The proposed activities specifically target developing AI skill competencies while providing such hands-on experiences that connect AI technologies with learners' mundane lives. Integrating these practical experiences into the curriculum enables educators to market very effectively the relevance and impact of the program in students' lives while showing how AI learning boosts their educational experience. This will enhance the quality of education and instill a more profound understanding and appreciation of artificial intelligence among young learners.

5.4. The structure of the early AI curriculum

The early AI curriculum [20] has modules planned that consist of two lessons; however, one additional AI activity accompanies each module. In this way, numerous AI concepts are explored in such a manner that

it would be most engaging and interactional. The diversity that will be drawn into every module allows the teacher to effectively enhance learning, bringing theoretical knowledge to practical application by the students. This move not only enriches the quality of education but also proves that the curriculum is doing its job by making the concept of AI better understood, so its appeal in selling it to schools and educational centers.

5.4.1 AI ethics

It introduces the children to AI ethics, which basically explains the errors and biases specific to artificial intelligence. The key takeaway here is to develop knowledge regarding data-driven bias and interaction bias that are more typical in AI (AI World school, n.d.). This module also contains engaging activities to help develop an understanding. The first activity is to send out a request that encourages children to draw scenarios where AI assists humanity and contributes both to creativity and an interesting discussion about positive impacts of AI. Students are encouraged to do concept mapping, which visually represents all the modules that have been covered in the curriculum. Actually, concept maps were first developed by Novak and his research team at Cornell University in the early 1970s (Novak, 1998), and since then have proven to be an extremely effective tool for helping children learn how to understand complex concepts and their inter-relationships.

It promotes learning skills, ease of comprehension of the course material, and improves the retention of memory. This technique is also very ideal for young children who find it hard to adapt to traditional ways of learning (Mindomo, 2020). This way, via the assessment tool concept mapping, teachers could establish the knowledge gained by the students as well as their ability to learn information from all four modules. In totality, this module will sensitize the students to ethical awareness while enhancing the quality of education and making the marketing savvy in the context of AI curriculum management. Instilling the general understanding of AI ethics better enables children to face the science of technology in their lives, and they will contribute positively to society.

DISCUSSION

The objective of this research paper is to develop an AI course that would be useful for the instructors and researchers in the enhancement of quality education. Although there are numerous studies which write about the AI tools and platforms, yet there is a substantial lack of research-based literature in terms of developing learning exercises and curriculum. This curriculum aims to improve the capabilities of children in AI, enhancing their thinking, creativity, communication, and teamwork abilities through group activities. This proposal discusses an explicitly stated structured framework for an AI curriculum for early childhood education, focusing on aspects such as aims or objectives, content and activities, methods or procedures, and assessment and evaluation. In this regard, the framework developed may become a particularly valuable tool for quality enhancement in teaching and the effective implementation of a curriculum. Most importantly, the research outlines an AI curriculum for early childhood education with three major focus components: AI knowledge, AI skills, and AI attitudes (Table 1).

Table 1: Pros and cons of AI utility in curriculum designing

Aspect	Description	Usage	Pros	Cons
AI in Early Childhood Education	Introducing AI concepts to young learners through interactive tools and activities.	Tools like robots or programming activities to teach computational thinking.	* Enhances computational thinking * Builds early AI literacy	* Complex concepts may overwhelm young children * Limited curriculum resources
AI in K*12 Education	AI*driven approaches to foster learning and critical thinking in students.	Problem*based learning, teaching AI concepts like machine learning and natural language processing.	* Improves problem-solving and critical thinking skills * Prepares students for future	* Requires skilled teachers for AI content * Potentially high cost of technology
AI in Higher Education	AI is used to personalize learning paths and optimize curriculum management.	Analyzing student performance, optimizing curriculums, and teaching advanced AI topics.	* Tailored learning experiences * Prepares students for AI-driven workforce	* Privacy concerns with data tracking * Initial setup can be complex and resource*heavy
AI for Marketing in Education	AI-driven curriculums help promote schools as modern and innovative.	Schools use AI programs as a unique selling proposition to attract tech-savvy students and parents.	* Enhances institution's reputation * Draws in students	* Overemphasis on technology may neglect traditional educational values

			interested in tech education	

- **AI Knowledge:** In this category, the five big ideas in AI; AI ethics, and its applications, machine learning, are included.
- **AI Skills:** This involves the provision of opportunities that facilitate the use of AI tools, CT, programming, critical thinking, and problem-solving abilities.
- **AI Attitudes:** Meaning the awareness about social impact of AI and motivating people to co-operate with AI technologies. In teaching methods, we would suggest problem-based learning be adopted instead of the project-based learning because kindergarten is mainly concerned with the introduction of fundamental AI concepts and simple activities for children, whereas secondary and higher education focuses on programming skills. Children in this age group naturally exhibit curiosity and inquiring tendencies, and problem-based learning would function effectively during a group activity for this age group. We further recommend appropriate methods of assessment for sure; and here we suggest using pre and post-tests to assess AI knowledge. Such assessments can clearly show just how effective curricula are. Similar previous research studies have employed these assessment methods just to measure AI knowledge among children already.

CONCLUSION

Early curriculum for AI is an emerging yet highly imperative research field. Most such researches, so far, are on secondary and tertiary education. AI education promises several avenues for further research and development concerning improvement of quality of education with necessary measures. The tools and platforms of e-learning need to be chosen by the researchers and the teachers as their precious educational resource. The design of the research focuses on developing an AI curriculum framework unique to early childhood education, along with activities that illustrate this framework. Curriculum design has three essential components: A comprehensive framework for the deployment of artificial intelligence in early childhood education, thus enhancing quality education in school education is designed .AI knowledge, AI skills, and AI attitudes. To aid the learning process, this paper presents four modules, five interactive activities, and one project suitable for students aged between 5 to 7 years old. This study will support AI educators and researchers in identifying which methods and courses would more suitable for young learners to improve their knowledge in AI education and also gives a foundation for further research in the early AI education. Ate timely, accurate, complete, adequate, and dependable ways to give and receive information from trading partners.

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