



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

ETHICAL CONSIDERATIONS IN AUGMENTING ARTIFICIAL INTELLIGENCE IN TEACHING METHODOLOGIES AT SCHOOL LEVEL

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10th January 2022

With the advancement in the fields of science and technology, artificial intelligence and machine learning has revolutionized the functioning of every sector. This unprecedented rapid development can be profoundly experienced in all facets of life, especially and more importantly in the field of Education. Every nation requires to involve and contribute to the implementation of this 'intelligent' education in this 21st century. Artificial Intelligence is one of the key pillars to strengthen the Teaching Learning process. Through Education sector Artificial Intelligence (AI) has the potential to address some of the biggest challenges in education today, innovate teaching and learning practices, and ultimately accelerate the progress towards SDG 4. However, these rapid technological developments inevitably bring multiple risks and ethical challenges, which have so far outpaced policy debates and regulatory frameworks. Artificial intelligence in education promotes the development of school teaching is still lacking in systematic discussion. This research paper discusses several aspects of artificial intelligence to promote teaching and learning reform, including artificial intelligence to promote the innovative development of teaching methodologies and learning methods along with the development of school teaching management, and to promote the need to reform of subject structure and educational content. With a view to encouraging the application of artificial intelligence in promoting the transformation of teaching and learning, it is proposed that schools meet new requirements in the era of artificial intelligence while addressing the ethical considerations.

Key words: Artificial Intelligence, SDG 4, Ethical Challenges, Transformation

INTRODUCTION :

Educators are perpetually finding methods to enhance students' learning and edifying experiences considering the fact that every learner is unique with different learning requisites. Educators often use digital technologies to give students access to sundry resources and materials to avail them prosper and to fortify their diverse learning needs. Since assistive technologies are available for all students, these implements can engage students and avail edifiers in meeting curricular goals, sanctioning them to be facilely integrated into classroom environments.

The majority of current inculcative artificial intelligence is provided through sundry software formats, making this technology more manageable and accessible in school settings. Assistive technologies that use AI can additionally significantly enhance student learning compared with other learning technologies or classroom ordinate dictation, making them efficacious at amending student achievement. There are variants of AI-predicated assistive technology, including applications, extensions, and web-predicated programs; this sanctions students and edifiers to cull the ones with which they prefer to work.

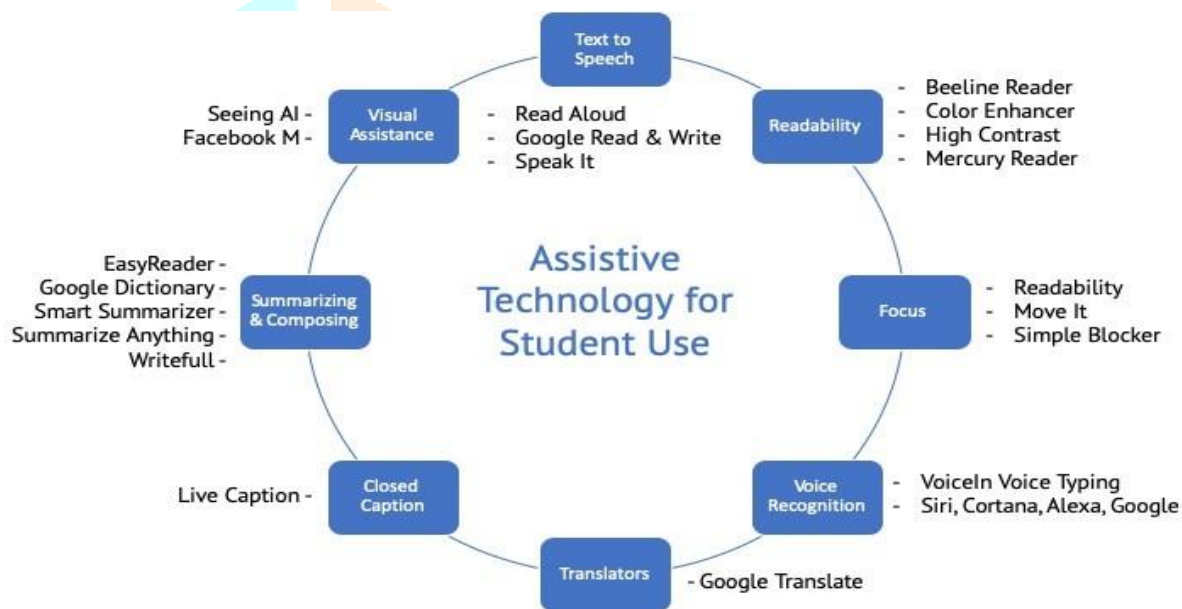


Figure: Various options for assistive technology to direct personalized learning. Created by K. Kerr (2020).

All classrooms are diverse in the edification and learning that occurs within them, and each one is personalized in some way. The inclusion of assistive technologies is one method for diversifying ordinate dictation and engendering personalized learning environments; however, these implements cannot function in isolation and depend on preceptor or Educators support. Experts and Teachers may seamlessly find ways to utilize these assistive technologies to maximize learning and resources, educators should recollect that most of these “products are not field tested afore adoption in schools and offer circumscribed to no research on their efficacy.

This notion can raise concerns about how student data is being used or manipulated, and there is debate around the inclusion of AI-predicated assistive technologies in the classroom; while they have the “potential to revolutionize learning” there is skeptically regarding whether or not they can amend edifying experiences and student achievement. As a result, AI-predicated systems should undergo more rigorous tribulations afore being utilized in inculcation, there should be standards in place for auditing AI systems, and ethical codes for utilizing AI should be held to a high standard of accountability.

Edifiers could additionally examine the following circumstances in which ethical concerns increase when utilizing personalized learning systems:

1. Teacher control or understanding of the program, app, or extension decreases
2. Increased integration of the data collected by the company and classroom activities
3. The type and amount of student data collected by the company
4. Any data is used to refine software programs

The inclusion of AI technology in the classroom can alleviate some aspects of a teacher's workload and can withal benefit student learning and achievement. Some AI that is available as assistive technology can be culled and tailored to fit individual student rates and styles of cognition, but not supersede the work of human edifiers because edifiers are better equipped to determine which edifying methods will meet the desiderata of each student. Edifiers can work with machine learning technology to solve quandaries and challenges, and when used congruously, it can avail their students become better learners and members of society.

Use of Assistive Technologies by the Educators: The utilization of technology to enhance orchestrating, facilitate edifying, and ameliorate assessment is withal fortified by policy, and could be a component of felicitous standards of practice for edifiers. Assessment policies often identify that assessments should be partialness-free and reflective of the diverse student population in the classroom. Assessments that amend injunctive authorization to enhance student learning are a component of responsive and ethical edifying, and this endeavor could be fortified by the utilization of AI-predicated assistive technologies. Edifiers can utilize these types of programs to grade student work; however, these programs do not currently apply to higher-level cerebrating and analysis skills, which designates that the duration spent on these assessments cannot yet be adjusted.

The ethical implicative insinuations of sanctioning a computer to grade an assignment in which critical cerebrating is obligatory are much more preponderant, given the subjectivity of most replications. Edifiers are responsible for ascertaining fair and equal treatment of all learners. Since assistive technologies would abstract subjectivity and grade a replication assignment from an objective perspective, students who apply the strategies that the program apperceives as exemplary could inequitably benefit. When utilizing programs that grade multiple cull questions, the magnitude of input required varies. Edifiers can determine which program best suits their desiderata and meets ethical criteria. Programs that require minimal personal information may be the better ones to operate in order to forfend student information. Edifiers often need to engender an account to keep a record of student names with their scores, item analysis, and answer keys for each test, but the decision whether to utilize the program could be made by edifiers, predicated on the terms of accommodation or privacy policy. Other programs require preceptor-engendered questions to be entered directly into the program along with the keyed replication, and students need to authenticate in to answer the questions afore receiving a grade. This log-in data may be utilized for the purport of benefiting the engenderer, or it could be sold to third-party distributors; thus, edifiers may want to verify where this information is going and apportion these details with students afore engaging with this form of AI-predicated assistive technology.

Effects on Teaching and Learning: Digital technologies should be habituated to fortify edifying and amend learning outcomes rather than to determine preceptor efficacy. When edifiers provide access to AI-predicated assistive technologies for their students, edifiers may want to consider how these technologies could be habituated to ameliorate edifying strategies, and if, or how, other students could benefit from these sundry fortifies. When utilizing assistive technologies, there is often a lack of transparency and incremented discombobulation over how data is accumulated and utilized, and who has sanction to access this data. If the information contained within the data can benefit student learning and achievement or benefit edifying strategies, then edifiers should be able to access this aforetime amassed data. Even though scholastic technology companies may intend to amend student achievement through data amassment, biases can often subsist or

develop with AI technologies. Bulger (2016) mentions that discussions of student data privacy address both data and privacy, but infrequently fixate on students, and the prospects and goals of personalized learning may not obligatorily match the fascinations of students, parents, edifiers, or even society. These concerns are valid, and edifiers could decide which assistive technologies to utilize predicated on the goals for each student. If the benefits outweigh the downfalls and sanction students to develop skills that not only avail them in the classroom but in their personal lives as well, the assistive technology is likely felicitous to utilize with students.

As much as edifiers should be concerned about bulwarking student information when utilizing assistive technologies in the classroom, there are some benefits to assistive technologies having this information. For example, while utilizing predictive text or verbalization-to-text extensions, a student's predilections can be preserved, and the assistive technology can develop to become more precise predicated on the input it receives. This process can enhance inculcative experiences as learning becomes more personalized for each student interacting with assistive technologies. School divisions can withal access this information to determine which programs, apps, or extensions should be sanctioned to utilize within schools and on division-monitored contrivances. Where possible, edifiers should take precautions to forfend students' personal information by making plausible security arrangements against such risks as unauthorized access, accumulation, utilize, disclosure. Albeit students and edifiers have concerns about privacy loss in the classroom, student data will likely perpetuate to be amassed on contrivances that are owned by the school division (Regan & Steeves, 2019). More preponderant transparency should subsist about the purport of this accumulation to identify whether the information is accumulated and maintained by only the school division to ameliorate student learning, or if it is shared with scholastic technology companies to enhance their own programs (or both).

Method : The aim of this work is to galvanize the AIED research community's engagement with the ethics of its domain. Accordingly, it was first consequential to establish community members' subsisting credences and understandings of the ethics of AI applied in inculcative contexts, to which end a survey of AIED researchers was developed and conducted. A Global Summit of Ethics in AI was organized by myself as a Founder of Global Youth Peace Accord inviting Prof. Dr. theol. lic. phil. Peter G. Kirchschräger as a Keynote Speaker. Dr. Peter is a Prof of Theological Ethics, Director of the Institute of Social Ethics. Along with him Speakers from the field of Technology, Health, Law and Education were invited to share their views on inclusion of AI in their fields. Dr. Sahid Cholayil from IIT Madras, Dr Jayashree Todkar from Mumbai and Adv. P. V. Sheheen from UAE were also invited to contribute their thoughts about implication of AI. A deep research and observations were made on the views and the participants who presented their ideas during the Summit.

Teaching Artificial Intelligence in Kindergarten : Children as young as three or four years old are using programmable devices, such as robotic toys and iPads, on a daily basis. It's never too soon to begin having conversations with children about the role of technology in their lives. The topic of ethics is particularly relevant when we consider the growing role of artificial intelligence in devices used by children, families, and schools. The broad question we must all consider is:
"What decisions will we let computers make for us?"

Children often became emotionally affixed to the technological contrivances. Many of the children interviewed verbalized their robotic toys were "alive enough" to care about them and care for them. Today there are even more types of sophisticated and lifelike robotic toys available for children. Adscititiously, children can engage in conversations with artificially astute auxiliaries such as Apple's Siri or Amazon's Alexa.

In Incipient York Times piece titled "Co-Parenting with Alexa," Rachel Botsman eloquently describes the solicitousness parents may feel when they visually perceive their children interact with AI contrivances. Botsman asks, "How do we edify our children to question not only the security and privacy implicative insinuations but withal the ethical and commercial intentions of a contrivance designed by marketers?"

The prevalence of AI in the circadian lives of families designates we must commence verbalizing with children about computer science and artificial perspicacity topics at an early age. We can't wait until they have learned to program computers and engineer robots.

An Ethics of Artificial Intelligence Curriculum for Middle School Students

To meet the growing desiderata for children to understand artificial perspicacity, its impact on society, and how they might shape the future of AI researchers and Educationists have worked on framing curriculum and designing syllabus for students. The designed curriculum for middle school students (approximately grades 5th-8th), most activities are unplugged and only require the materials included in this document, albeit unplugged modifications are suggested for the activities which require computer access.

Learning Objectives

1. Understand the basic mechanics of artificial intelligence systems.
2. Recognize algorithms in the world and be able to give examples of computer algorithms and algorithms in everyday contexts (for example, baking a cake).
3. Know three components of an algorithm: input, steps to transmute input, output.
4. Know that artificial astuteness is a categorical type of algorithm and has three categorical components: dataset, learning algorithm, and prognostication.
5. Understand the quandary of relegation in the supervised machine learning context.
6. Understand how the quantity of training data affects the precision and robustness of a supervised machine learning model.
7. Recognize AI systems in everyday life and be able to reason about the presage an AI system makes and the potential datasets the AI system uses.
8. **Recognize there are many stakeholders in a given socio-technical system and that the system can affect these stakeholders differentially.**
 - i. Identify relevant stakeholders in an socio-technical system.
 - ii. Justify why an individual stakeholder is concerned about the outcome of a socio-technical system.
 - iii. Identify values an individual stakeholder has in an socio-technical system, e.g. explain what goals the system should hold in order to meet the needs of a user.
 - iv. Construct an ethical matrix around a socio-technical system.
9. **Apply both technical understanding of AI and knowledge of stakeholders in order to determine a just goal for a socio-technical system.**
 - i. Analyze an ethical matrix and leverage analysis to consider new goals for a socio-technical system.
 - ii. Identify dataset(s) needed to train an AI system to achieve said goal.
 - iii. Design features that reflect the identified goal of the socio-technical system or reflect the stakeholder's values.
10. **Consider the impact of technology on the world.**

Reason about secondary and tertiary effects of a technology's existence and the circumstances the technology creates for various stakeholders.

Societal Impact of AI

AI can impact society in both positive and negative ways. AI technologies are transmuting the ways we function, peregrinate, communicate, and care for each other. But we must be mindful of the harms that can potentially occur. For example, biases in the data used to train an AI system could lead to some people being less well accommodated than others. Thus, it is consequential to discuss the impacts that AI is having on our society and develop criteria for the ethical design and deployment of AI-predicated systems

Ethics: what sorts of applications are desirable/permisible?

- Transparency and accountability of AI systems
- Competing definitions of “fairness”
- Values tradeoffs, e.g., privacy vs. security; who should own your data?

Effects: what are the likely impacts of AI technology on society?

- Robot servants, rescuers, and companions
- Economic disruption; changes in the nature of work
- Effects of unintended biases

Major Concepts around Societal Impact

- AI technologies are transmuting business, healthcare, inculcation, and regime
- Use of AI is an economic driver that makes incipient accommodations possible and businesses more efficient
- Humans make numerous technical and ethical decisions when developing AI applications
- AI technologies impact communities and people in different ways
- Ethical standards are needed for AI systems that make decisions about people
- AI and robotics will transmute the way people work, engender incipient jobs, and eliminate some jobs

What should students be able to do?

Grades K-2:

- Identify common AI applications encountered in their daily lives
- Discuss whether common uses of AI technology are a good or bad thing

Grades 3-5:

- Explore how behavior is influenced by bias and how it affects decision making
- Describe ways that AI systems can be designed for inclusivity

Grades 6-8:

- Explain potential sources of bias in AI decision making
- Understand tradeoffs in the design of AI systems and how decisions can have unintended consequences in the function of a system

Grades 9-12:

- Critically explore the positive and negative impacts of an AI system
- Design an AI system to address social issues (or explain how AI could be used to address a social issue)

Conclusion :

Teachers and Educators have a sizably voluminous responsibility in channelizing the best out of AI in Inculcation and should ascertain that students understand the consequences and outcomes they could experience when utilizing assistive technologies in order to forfend their privacy and data. To avail bulwark personal information, edifiers could withal ask questions about data accumulation and security, especially if this information is obscure. They would then be able to determine whether this data accumulation benefits ordinate dictation or whether it is intended for surveillance. This strategy can avail promote transparency in terms of data amassment and privacy and the impact that it has on students utilizing these inculcative implements.

Surveillance and tracking often require the amassment of detailed information, which suggests that incremented monitoring of students’ activities, and the utilization of data engendered from those activities, could negatively affect student and preceptor engagement with assistive technologies. A peril associated with utilizing assistive technologies that rely on AI is that a multitude of data is now available to track students and their progress, which could lead to a fixate on performance numbers and could impede overall student engagement or call into question preceptor performance and efficacy. This outcome would not be in the best interest of students or

edifiers, which is why tracking information through AI-predicated assistive technologies could be detrimental to student achievement.

Students are often enheartened to bring their own contrivances to school, as they are typically more habituated with them, but when utilizing assistive technology programs or apps that have to be installed on the contrivance, students' personal information and data is likely much more accessible to scholastic technology companies. If students utilize their own contrivances, the privacy bulwark and security provided by school divisions may not subsist to the same extent as it would if students were to utilize a contrivance owned by the division; however, students who operate their own contrivances typically utilize the division's internet. This access often sanctions certain apps, webpages, or extensions to be blocked to forfend student information, which avails minimize the peril of data and/or security breaches. Certain programs can additionally be installed to bulwark student data and privacy from being obtained by unauthorized companies or users.

Edifiers should be vigilant and understand that many companies require users to opt out if they do not optate their information to be shared; ergo, by acceding to utilize their implements, implicatively insinuated consent has been given to data accumulation and sharing. If the company owns student data and information, they can opt to utilize this information as outlined in a utilization accidence. The question arises of whether or not scholastic technology companies "should be able to utilize data engendered by students' utilization of their software programs to ameliorate those programs" and make students "test subjects for development and marketing of future ed-tech products". Edifiers should examine how student data is accumulated and used afore sanctioning students to interact with AI-predicated assistive technologies in the classroom. In their review of inculcative technology companies, Regan and Jesse identified that "these companies are amassing quite detailed information on student demographic characteristics in their databases, as well as detailed information on student learning records". Albeit determining precisely which data points are accumulated and stored by companies who engender programs, applications, or extensions for the purport of availing student learning could be arduous, edifiers could review the details verbalized in utilizer acquiescent to identify how data will be used afore implementing them in the classroom.

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