EDUCATIONAL TECHNOLOGY AND ICT

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Lecture-55

Module-55: Artificial Intelligence in Education (Part-II)

Hello dear learners, welcome to the SWAYAM-NPTEL course on Educational Technology and ICT. I am your course coordinator, Dr. Sarita Anand, from the Department of Education, Vinaya Bhavana, Visva-Bharati, Santiniketan, West Bengal, India. Today, we will talk about Module 55 on Artificial Intelligence in Education. This is Part 2 of this topic, and this is Lecture 55. Before going into the topic, we will review the concepts covered. Earlier, we discussed the Artificial Intelligence in Education, Part One, where we covered the basics of Artificial Intelligence, the concept and definition of AI in education, applications of AI in education, examples of AI tools for teaching in the classroom, and we also explored the advantages and challenges. Additionally, we had demonstrated Quizizz, Canva, and another interactive app, Prezi AI. Okay? I hope you remember.

Now, today, we will talk about the topic: Generative AI. About Generative AI you all have heard the term 'Generative AI.' It is a type of Artificial Intelligence that autonomously creates content in response to prompts. These prompts are essential to understand for using Generative AI, provided through a natural language interface.

Unlike traditional search engines that retrieve and organize existing web content, Generative AI generates entirely new material. We hope it is entirely new material, but sometimes it is repetitive. This content can take various forms, including written text, digital images such as photos, illustrations, and cartoons. Also, videos, music, and even computer code. Generative AI is developed using vast datasets collected from sources like websites, social media, interactions, and other digital platforms, which can be utilized for communication processes or educational purposes.

It operates by statistically analyzing the structure of words, images, and other data components, identifying common patterns and reproducing them. For example, it determines which words are likely to follow others in a sentence and accordingly generates the response. Now, we will try to briefly understand how generative AI works. This generative AI is powered by machine learning, a branch of AI that uses algorithms to continuously refine its performance based on data inputs. A key advancement in AI has enabled applications such as facial recognition and artificial neural networks, which we call ANN.

These are technical terms that people from the education field do not need to understand deeply because we are the users of AI. These networks are inspired by the human brain and replicate synaptic connections between neurons, allowing for complex pattern recognition and decision-making. Different forms of generative AI rely on specific AI models. For example, text-based AI tools like ChatGPT, which you are all using. It uses generative pre-trained transformers, which we call GPT models, while image-generation AI often uses Generative Adversarial Networks, or GANs.

These AI models have been developed over the years, and ongoing research continues to enhance their capabilities. For instance, Google Gemini, which was earlier barred, has developed itself in many ways. In newer versions, when they developed Gemini, it did not have many functions, but now you can see that it not only generates content or text versions of images but also allows you to add them to emails and perform many other tasks. Gemini also creates links for the content generated using your own prompts. There are many features in these kinds of generative AI.

If you want to learn about generative AI, I suggest you go to Google and search for 'Introduction to Generative AI.' There is a course you can follow on the Google page to learn how it works. The rise of ChatGPT and its impact: the market is now filled with generative AI, and competition has arisen with the introduction of ChatGPT. Although generative pre-trained transformers, or GPTs, have been available to researchers since 2018.

What made the launch of ChatGPT unique was its free and user-friendly interface, allowing the anyone to internet access to explore its capabilities and the normal users like students and the teachers are very much able to utilize this GPT. This accessibility triggered a global response, prompting major tech companies and startups to either develop their own AI models or build tools that leverage the technology like ChatGPT and in the response of this

competition you have seen that earlier DeepSeek has came from China and Gemini was also improved their working so what are the alternative AI models to ChatGPT.

As a teacher educator, I always suggest that whatever prompt you are giving and utilizing the ai for your educational content purpose please you check it, you cross check it, refine it and after that you will be able to use it for your students, like there are so many ChatGPT similar AI models like Alpaca this Alpaca is developed by Stanford University and based on the Meta's Llama, you are also aware of that Meta that is roaming with your mobile phone frequently you are using with WhatsApp Meta and earlier the Bard next one is the Bard.

Bard was Google's AI but now that is Gemini, they have modified it and now we call it Google Gemini, Gemini is also working having the features like ChatGPT and I have seen that many features are different than the ChatGPT also, and the Jasper is also a versatile AI tool and especially for the writing style and generating the images. Hugging Chat, Llama is also there and Open Assistant, Deep Seek is also there. Deep Seek is right now giving the competition to all kind of GPTs because the people are talking about it and because this is cheaper than the other GPTs and till now this is free and you can access it and I have compared it with the ChatGPT and Gemini that it is taking little more time to understand the prompt and generate the response but definitely generating the enough good replies and content.

Then another one is the YouChat, this is the language model and you can utilize this one also, but I always suggest that accuracy and readability of the response should be checked or cross checked by the user. So, many of these AI models are free and having maybe something some are having the specific limits of the word limit and maybe content generation limit. So, you have to choose wisely that what kind of GPT's you are going to use.

Now the prompt engineering, these terms are actually the technological term from the field of science and technology but if you are trying to craft your input for the educational purposes, because we are talking about the AI in education, so generative AI tools can generate content with the simple text prompt and achieving highly refined output requires strategic prompt engineering, and these days we call the term that prompt engineering. If you are having the good prompt engineering then definitely you will be able to generate curate the appropriate content with the help of these AI tools. Recently you will find that there was award for this prompting work AI generated artwork Theater de Opera special

which won an award at Colorado State Fair was the result of weeks of prompt refinement and adjustments to the hundreds of images.

This is the research done by Roose (2022) and you can understand that how serious task is to give the proper prompt. Similarly, effective prompt for text-based AI tools requires careful wordings and structuring to obtain the desired response. As a result, prompt engineering, the practice of designing precise and effective inputs to guide generative AI emerged as the important skill. If you are talking about the prompting, now these days there are course works, FDPs are going on in the name of prompt engineering. They are giving the training, how you will prompt your AI to generate the better response, the demand for the professionals specializing in this era has grown and which prompt engineering roles becoming increasingly visible on the job recruitment platforms and this is also studied by the Popli (2023) and you can understand that the importance and the role of prompts in the field of AI the development of Refined GPT models for education is still in the early stages.

Many people, many organizations, scientific societies are working on the AI tools for the educational purposes. Some existing examples include EduChat and open-source foundation model created to provide teaching and learning support. It means if you are interested to utilize the AI for educational purposes, you go and see how EduChat works.

Similarly, the Math GPT is an AI model focusing on the mathematics related instructions and problem solving. So, if you are interested to mathematical tasks, you please check the Math GPT. So, AI powered applications and tools I have mentioned many names here, later I will give the links also, now the AI tools for research list is enormous you can go through the list you will search on the google even you ask these things to any ai they will tell you but whatever I have used. I have mentioned the few of them in this ppt like ChatPDF it summarizes and answer the question about the uploaded pdf document if you are not interested to read out the whole pdf of the book or the journal then you can utilize the ChatPDF elicit is the AI research assistant and it helps you to identify identify the relevant academic papers and summarizes the key insight actually if you will see that positive side is that it is saving our time but the negative side is that our reading habit will be decreased.

The Perplexity is the knowledge hub providing users with the custom-made accurate answers to their queries. Now, the image generation AI tools I am just only giving the name and this is your responsibility as a learner that not all the tools but only one two tools you should explore and you will find that many are very good for your image generation if you

want to generate for your research purpose or maybe daily teaching and now I am not repeating the name, I have just given on the screen.

Then the music generative AI models they are-There are many are there that Aiva and Boomy, Sundrew and Voicemod these type of AI are generating very good musical things and video generative AI models, these video generative AI models are capable of generating the video with the audio also. So, music can be also generated with the help of these video generative AI model especially the Pictory and the Runway are generating the video and also providing the option for editing so you can go through it then comes the links for AI useful in education which are mentioned in the discussion.

So, I have created exhaustive list for you all that you can go through this list just when you will get the pdf you have to click it and because i have given this hyperlink and you will click it and you will be able to use it and this list is long and you homework you can say that you have to just click and explore that which AI tool is for what

If we are discussing about the Crayon, the crayon is mean for what? If we are talking about the perplexity, then how perplexity is working? There are so many video tutorials are also available for you all. You can explore those tutorials also for learning this kind of AI to use. and now specifically for the teaching learning process when we are talking about the teaching learning and research in education, we have to know the different AI tools at least we should know the name and in every field which are required in your teaching learning process you can have the expertise by using and reusing those AI like the for the audio content creation speech to text and transcription purposes you can use the Otter AI.

Otter AI is very famous the descript and google cloud speech to text, this google cloud speech to text is very famous in the before ai coming we were able to type the voice step texting and all the so these facilities are there audio generation and enhancement adobe podcast and Murph AI is also there you can utilize this apart from these list there are so many others are available but I have mentioned only few few then the video creation and editing say synthesia runway I already said Lumen5 and Pictory, these are the tool for video creation AI tool and video analysis and interaction you want to analysis analyze the youtube captions then go for this AI Veed.io and there are other AI also, but now we will talk about the text because in the last week of your course you will find that there are the topic is for the digital content creation for the teaching learning and whenever we are talking about the digital content creation you will find that we are talking about the text, audio and video basically.

So, if picture generation, image generation, graph, chart, anything else, then definitely there are some apps or the AI available. I have mentioned here Google Bard, but I will suggest you should go for the Gemini. Then the ChatGPT, Quillbot, Jasper, Grammarly, and also different other like Magic School AI is there for the text generation but text generated with the help of these AI's you have to cross check it, suppose they are mentioning some place or some year then you have to cross check that year is okay, that concept is okay or they are generating by their own so misinformation may be there.

There is possibility so you have to cross check it then the ppt presentation in previous lecture I had shown you the ppt presentation with the help of Prezi AI and these are the facilities for the teachers that within few minutes i can generate the ppt and I will be ready to present in my class so beautiful AI tome and Gamma, Gamma is now becoming very famous for the PPT presentation, similarly like Alaina and SlidesGo and Slides AI have mentioned. So, sometimes we forget the name and at the time of teaching we recall that AI have missed, so their names are long. The graph and chart for data visualization, you can use Tableau, Google Sheets and Canva. Canva, I have already demonstrated that many kinds of tasks you can perform with the help of Canva.

Now, the image generation AI, I have already mentioned that mid journey or stable diffusion and many others are like Adobe, Firefly is there. and if we were talking about the editing of those photos Adobe photoshop is there since long and again Canva is doing the same job for editing the photos, then comes the animation, animation there are many AIs are available like Pika labs Runway ML, Kiber AI and maybe I think, I forgot to the did give the Renderforest if you are listening me so you have to keep the name of Renderforest also. Runway ML I have told that many times we forget the name. So, I forget to mention the Renderforest.

Renderforest is very good platform to not only generate the animation video, but also for the logo and other animated pictures for your promo videos. This is a very good platform for generating the animation videos. Then the banner poster and pamphlet designing. if any kind of task you want, you go for Canva and also Adobe express is there and now i am referring you one book for your study purpose one of the participants has asked in the discussion forum so there is a book on guidance for generative AI in education and research Published (2003) by UNESCO and this link I have given for you all.

So, you go through it and they have precisely mentioned that how and why we should use AI and how it will play an important role in teaching and education purpose. So, limitation

of AI, there are limitations, similar limitation I have already mentioned in the previous lecture also. That true understanding and reasoning will be lacking here with the generated content and Inaccuracy and Hallucination may be there, maybe they are providing misinformation. Suppose if you are these days, you will see the pictures generated with the help of Copilot.

Other AI app for the picture generation they are hallucinating the images and feeling very good by the pictures even I have seen the picture of God and goddesses and how beautifully they are creating but actually that is hallucination and maybe sometimes they will provide you the inaccurate pictures I have seen some picture I have prepared for my class that students are studying this was a mistake by Copilot, that students are studying in the class with the tablet and smartphone on the screen we have to describe the scene and they generate, so amazingly that class student was sitting in front of the smart board and his face was backside so can you imagine that was looking like horror that whole body was in front and head face was backside.

So, this is the Hallucination or Inaccurate picture may be generated by the AI, so ethical concern and biases are also there may be harmful content or maybe some vast amount of data which are biased can be generated with the AI, some AI generated text images or video that are reinforced social biases discrimination or harmful stereotypes should be avoided, I have seen many times whenever I write that teacher is teaching every time the co-pilot generates male teacher then I have to define that the female teacher wearing sari and all then they generate the female teacher otherwise the AI is having the concept of teacher that the male teacher so this kind of a stereotype is there if you will be using time and again these AI then you will be able to understand this kind of limitations.

Also, the copyright and intellectual property issues are there, if you are remembering the last presentation on Prezi AI, you will see that many pictures that utilized by the Prezi by itself. So, maybe that picture is copyrighted pictures and you are not aware that is AI generated, you are thinking that is free. So, be aware of that and whenever you are using either it generated by images, music, written work or anything else generated by AI, you have to face the legal consequences.

So, better is that you mention that this content is prepared with the help of XYZ AI, simple attribution is required if you are giving the attribution there will be no problem. Over reliance on technology definitely I always tell my students previous lecture, I also told that you give the command to AI don't be the slave of AI, don't give your brain to AI, so over

reliance is not good your creativity your thinking power your higher order thinking level your HOT will be destroyed so don't be dependent use it wisely privacy and security risk. There will be privacy and security risk definitely. If you are using generative AI with the uploading your pictures, your documents or any other personal information then definitely that can be exploited to create deepfakes.

This is the era of deepfake also. Misinformation, any identity theft can be there with the help of these deepfake videos. You have listened the news that many deep fake videos spread false narratives or impersonate or the improper information regarding the individual, so be aware of this kind of threats these are the limitations of using AI so high computational cost and environment impact is there limited creativity and originality, if everyone is using the AI you will be knowing that a similar type of pictures photographs will be generated and you will be able to recognize this is AI generated.

So, the the text content, pictures or video generated through AI is traceable, we can trace it. Lack of human touch and emotional intelligence definitely this is the biggest lacuna that however they have tried hard AI is very good, but that cannot touch the human effect and the digital divide and accessibility issue, this is the issue which can be fulfilled with the training and computation and this is the limitation, but yes with the time we can fulfill this gap.

Now I have given the few of the AI's especially the generic AI like Krutrim, I have kept the Krutrim in number one because this is the india's own AI, first indian AI Chatbot similar features like ChatGPT available in different languages also if you will go and click on the link you will ask him- ki kya aap mujh se hindi mein baat karenge, if you will type then definitely it will start responding in Hindi so this is all the GPT's are chatbots; are replying in English but this Indian version is having two option Hindi and English I have used it and is pretty okay with that response then comes the Gemini, Gemini you know this is the Google product ChatGPT you all are aware I know need not to explain anything. Only I will take two examples to show you. Already I had talked about the Copilot. So, I will go for ChatPDF. So, if you are a good researcher and reader, you want to explain something. So, you can utilize ChatPDF, you are having the book of 500 pages, 200 pages and you want Giest of that.

So, that can be also done by the with other documents also, but ChatPDF is mean for that. Not only that it can generate the audio also you can listen that what kind of content is provided in that book. So, this is good for not only the normal student but also the students

like the visually impaired students can be benefited with the help of ChatPDF and the Napkin whatever graph and picture generation I am using to explain your different type of graph is I am making with the help of Napkin AI. Content is mine but the prompt is given to the Napkin and just you have to give the text and it will generate different type of graphs and you have to choose that, which will be the appropriate for you so I will not talk more and I will show you the two features of these AI ChatPDF and the Napkin so I will go with the link now I will open the ChatPDF to show you how it function. So, if you maybe it will take time, it's opening, I will just demonstrate because i will request you all that if you want to learn it you have to use it, it's opening so you can see because i have already used, so i will go with my own id because if you are trying to use it you have to sign in

So, earlier I have shown you in one lecture that NEP and guidelines for 50-hour CPD, Continuous Professional Development. At that time when I had to prepare some gist of this document, then I had utilized it. You can see that I have uploaded this document and after that this is providing the gist of this document, you can see. then I have gone through the one by one and if you will ask that please generate the audio it will generate the audio once I was working for the NEP 2020 then I had generated some if I have time I will show you but now you can see that there is the option of new chat and new folder and if you want to upload information then you go to the Page new chat and you will find if you want to ask Upload then this is giving the option is if you are having some document I don't think I should use because this is someone else's system, but you just have to upload it and after uploading this book or the Journal or whatever content you have uploaded.

This will be here and you have to give the prompt that what you want. You want to do the summarize. So, I have given that summarize these guidelines and it has summarized that what has been written in which point. So, this is a very good AI and the next one is I will show you the very frequently I am using that is Napkin AI. this Napkin is very good app for the all the teachers who are teaching either in any subject group, that will be beneficial beneficial for you I will show you just it is opening, okay this is the interface you will see when you will open it I will go to Napkin sign in, I am already signing okay this is opening so remember this Napkin AI and you have to do nothing just you have to sign it you give the your credential.

I have already sign in so just I have given my email ID and simply you have your content with you whatever text content is there you just have to keep with you and you need to just paste it in the Napkin AI and it look like Napkin and then just wait for the creation and it will create the graph as per your requirement so it is taking too much time yes it is opening

maybe network issue you can see here is the option new Napkin and here is the library maybe it will show my previous yes all kind of graphs I have prepared with the help of this Napkin AI that can be seen here in the library whatever you have prepared if you have signed in it will be shown, you can go in the history as you can see that whatever i am teaching you that all are new and fresh, which i am providing you all. Dear learners, it was taking little bit time. Now, the new Napkin has been opened.

Just we can work like if you are interested to work with the draft with AI, you want to write like similar GPT, it will work. It will provide the space for writing. You write your content and it continues. So, I am going for the blank Napkin. So, this is the blank Napkin and you just have to paste your content.

For example, I am just pasting one line from the same PPT which I was showing you and this is the selection of this Napkin. Just you have to click on this generate visuals and just after clicking it will read out your content and it will try to understand that how and what kind of graphics you are requiring and see that it is generating see like this in previous lecture I had used this kind of design, hope you remember and these are the style of working of this Napkin and you just have to choose that what kind of design you are interested if you are not liking it you can change it. You have to just give the content you do not need to do anything for the creation of this kind of graphics, so i will suggest you all that if you are trying to work about the graph preparation or any kind of these image preparation then go for the I have clicked and it is generating new type of image you can see this is the graph.

So, this was all about the Napkin AI and this is easiest I can say this is the easiest in AI and this is the best, you can say best AI for the teachers like us who are using this kind of artificial intelligence for your teaching learning process. So, these things I have not written, but with the help of my content it is generating for all of you. Now, we will go for our presentation which we are stopped in our class then next we will go for the Gemini AI I am leaving this topic because you all are aware of the Gemini so I am not going to talk about the Gemini and directly I will go for the conclusion. And for the conclusion, we must say that the AI is significantly transforming the education and the research by enhancing the automatic teaching and administrative task and providing intelligent tutoring systems and emergence of generative AI such as ChatGPT, Gemini has further extended AI's role in education by enabling the automatic creation of lesson plans, assessments, interactive learning materials which I have shown you with the help of Napkin AI and even real-time feedback mechanism is there.

AI cannot replace the human educators you should remember but it can facilitate our teaching learning process as it lacks the ability of fostering the critical thinking, higher-order thinking and emotional intelligence and ethical reasoning qualities that are essential in holistic education we should remember that and furthermore the reliance on AI generated content, this is necessitates the AI literacy among the teachers and the students ensuring that AI is used responsibly and critically evaluated, so again remember that you give the command to AI not your brain So, I have given few references for you all. You go through the references. These are the references.

Thank you and keep learning.