

Impact of Generative AI on Student and Teacher Experiences in academic journey

Dilip Kumar
Cloud Engineering
Oracle
Bengaluru, KA, India
ravichandrandilip@gmail.com

Rahul Gupta
Cloud Engineering
Oracle
Kolkata, WB, India
rahulgupta.rg@gmail.com

Abstract— The rapid inflow of information in academic settings has necessitated novel solutions to augment the learning experience. This paper focuses on the application of advanced content summarization algorithms in combination with intelligent quiz generation, catering to both student and teacher personas. The primary objective is to streamline the absorption of complex study materials and facilitate effective assessment to aid, expedite and enhance the overall education experience.

From a student perspective, content summarization algorithms employ contemporary natural language processing (NLP) techniques to summarize huge educational data, while retaining its essence. This not only allows students to grasp key concepts quickly and efficiently, but it also helps to optimize their study time, and bolster their understanding of the subject matter. Furthermore, the integration of AI-driven quiz generation enhances the learning process by offering interactive assessments that engage students with varying levels of difficulty. These quizzes are dynamically generated based on the summarized content, enabling students to gauge their comprehension and identify areas that require further attention.

From the perspective of teacher, the paper explores intricate algorithms that analyze educational materials and create concise summaries with retention of crucial information. The algorithms consider semantic associations, contextual importance, and domain-specific terminologies to ensure accurate interpretation. In addition to this, it helps the teachers to design quizzes aligned with curriculum goals from study materials.

This presentation investigates into the technical intricacies of the content summarization algorithms, with application of various techniques such as abstractive and extractive summarization, chunking techniques, and attention-based mechanisms. Furthermore, it explains the process of generating diverse quizzes, including question format variation, answer choice randomization.

In conclusion, the process of transcription of content into text format, using text information to create content summarization, quiz generation via complex algorithms holds the potential to aid different personas in their academic journey, overall revolutionize the academic landscape. By catering to both student and teacher needs, this approach empowers learners with efficient study aids and supports educators with dynamic evaluation tools. The paper underscores the significance of striking a balance between comprehensive content coverage and concise representation, offering insights into the intricate algorithms that drive these innovations.

Keywords— *Generative AI, Summarization, Quiz generation, Natural Language processing, Academic application.*

I. INTRODUCTION

The advancement of technology has continually reshaped the way we perceive and engage with academics. In an age outlined by quick innovations in the field of artificial intelligence (AI), the conventional frontiers of the academic journey are being effectively redrawn. Generative AI, a subset field of AI that excels in creating content autonomously, has emerged as a transformative force in many fields especially education has a long list of benefits that can be utilized. It has the potential to go beyond the limitations of typical pedagogical methods, introducing a new paradigm that redefines student and teacher experiences in profound ways.

In this age of digital insight, educational institutions worldwide are increasingly utilizing the power of Generative AI to enhance and advance the learning process. From personalized content creation to intelligent tutoring systems, AI-driven educational tools are transforming how knowledge is disseminated and absorbed. Students, in turn, are experiencing a shift towards individualized learning paths tailored to their unique needs, while educators are at the forefront of innovative teaching methods that leverage AI's capabilities.

This paper explores the "Impact of Generative AI on Student and Teacher Experiences in the Academic Journey". Through an extensive analysis of relevant literature, empirical evidence, and real-world case studies, we aim to elucidate the multifaceted impact of Generative AI on education. We will explore the ways in which Generative AI is enhancing student experiences by providing personalized learning content, facilitating instant support through AI-driven chatbots, and reshaping the very dynamic of the student-teacher relationship.

Furthermore, we will examine how educators benefit from the integration of Generative AI into their teaching practices, including time-saving content generation and automated grading systems. However, this exploration is not limited solely to the advantages; it also considers the ethical implications and potential challenges associated with this technological revolution. As we navigate this transformative landscape, questions about data privacy, algorithmic bias, and the delicate balance between human expertise and AI assistance are emerging.

This research paper seeks to provide a comprehensive understanding of how Generative AI is not only transforming but also redefining the educational landscape. It will highlight

the potential benefits, challenges, and ethical implications of this shift, ultimately resulting in the ongoing debate on the intersection of AI and education. As we embark on this journey through the realms of Generative AI in education, we invite the reader to explore with us the profound impact it holds for students and educators alike in their academic journey.

II. STUDENT AND TEACHER PERSPECTIVE

From a student's perspective, our proposed idea can be used in below mentioned use cases.

A. Video content Summarization for Description (for Students)

While there are enumerable video contents available online, it becomes difficult for students to understand relevant ones and they end up spending a lot of time and effort perusing many unrelated contents. This generative AI model that parses through the entire video to create a transcript and use the complete transcript to further assimilate the content into fine summaries of the entire content, which later can be added as video description could help overcome the challenge highlighted. Students can just read through the description and get the context of the video beforehand.

B. Transcription for aiding student learning (for Students)

Furthermore, video content is also a challenge for specially abled students who cannot hear the audio part of it. Our proposed generative artificial intelligence model becomes very relevant here as it can create the entire transcript as is from the video and make it available for such students to read through and learn from the same content. This approach ensures that education is adaptable to the unique requirements of diverse learners, whether they are in a traditional classroom setting or accessing education remotely.

Get the transcript from Video

```
transcript =  
YouTubeTranscriptApi.get_transcript(video_id)
```

Concatenate the transcript into a single string

```
transcript_text = ""  
for segment in transcript:  
    transcript_text += segment["text"] + " "  
print (transcript_text)
```

C. Multilingual support (for Students)

Further, India being known for its multilingual states and union territories, making enormous amount of valuable educational content available to all is always a challenge. It is one of the major reasons that children across different cultures, groups, regions are often knowledge deprived in spite of content that are reachable but not fathomable. Once again our proposed generative artificial intelligence model becomes an effective tool for translation of generated transcripts to different regional languages that can be effectively utilized by students from different backgrounds..

From teacher's perspective, our proposed model can be used in below mentioned use cases.

Using Huggingface pretrained models for Translation from the transcript text

```
model_checkpoint = "Helsinki-NLP/opus-mt-en-hi"  
#English-To-Hindi  
translator = pipeline ("translation",  
model=model_checkpoint)
```

D. Quiz generation (to support Teachers)

Testing the knowledge imparted to students is one of the primary objectives for a teacher and testing through quizzing has proven to be an effective way to assess the same. Manually creating questions and multiple answers for each of the questions is not only a time consuming but also an exhaustive exercise. A system built for generation of multiple-choice questions from the factual educational content can solve this problem and that is where our proposed generative artificial intelligence model can be used effectively.

E. Knowledge sharing across boundaries in a common language (to support Teachers)

In recent times we have seen adaptive education system is the need of the hour. Not only when we compare offline vs online forms of education from teacher to student, but also knowledge sharing of high educational content among teachers who are not affluent in the most common languages (say English) used across industry. With translation and transcription of such contents in local regional languages, which teachers from specific regions can self-understand, leverage and adapt in their teaching can be a big boost for them. We strive to solve this problem through our proposed model.

One such avenues is to engage in Virtual exchange programs enriched by Generative AI to enable teachers to engage in cross-cultural teaching without leaving their classroom. This collaborative global network enhances the professional development of teachers and enriches the quality of education. AI-facilitated collaboration between teachers across borders has become increasingly feasible. Educators can share the best practices, resources, and experiences, overcoming the limitations of geography. This collaborative global network enhances teachers' professional development and enhances the overall quality of education.

F. Comprehension through summarization (to support Teachers)

Further, internet and various online education platforms have increased the accessibility of educational resources from all over the world. With so much disposable content, it can be a tedious task for teachers to cover so much and make it comprehensible for students. What if we can collate and compare documents to extract unique context from each, summarize relevant artefacts to a shorter format and use the same for a more enriched knowledge transition. It can be a great tool and our proposed model envisions to be able to achieve the same.

In summary, the influence of Generative AI is redefining the academic journey and making quality education more accessible and adaptable to diverse contexts around the world.

III. IMPACT ON STUDENTS AND TEACHERS

There are equally good and bad areas of using the technological advancements before we undergo strict regulation of the tools, systems, and processes from time to time.

A. Positive Impact of Generative AI on Students

- Chatbot interaction can help under-performing students to learn without fear of interacting with a teacher in a classroom setup. The student is ready to take on challenges and difficulties [4] that are usually not possible with a human interaction.
- Availability of content to learn from interaction of a chat-bot systems anytime, anywhere is one of the key highlights in the positive impact created by generative AI in terms of Q & A. Searching the content for specific queries
- Language barrier that is broken down with the help of generative AI with access to translation of content from any language to a required target language has vastly contributed to the student development. The self-learning skills and digital literacy to grasp new technical skills in their own language is much better [8].

B. Negative Impact of Generative AI on Students

- We are in very early stage to identify how generative AI can be used and applied in educational contexts. To our knowledge, seems like most of the research have been conducted in the field of higher education rather than for young students at school level. For such young adolescents, their emotional and cognitive intelligence are nurtured in schools under human supervision [1] for which AI may not be a direct replacement.
- Being aware of the fact that self-regulated learning is less sophisticated whereas classroom learning, being under the supervision of teachers, are more regulated [2]. This implies how important a role teachers play under the setting of classroom teaching and physical mentoring. To our knowledge, no such studies have been conducted to assess how generative AI has changed school education.
- Generative AI cannot be completely reliable and can still have errors or generate inaccurate results. So how students judge the authenticity of output remains a vital question. Are they trustworthy? Are they appropriate? Are they able to generate outputs which are ethical and moral? Will students be able to differentiate outputs generated by AI on such factors? Such questions need deeper research and understanding.

C. Positive Impact of Generative AI on Teachers

- Generative AI has been changing the way teachers can teach and assess learning outcomes of students [3]. Preparing a question paper from long factual educational content still is a time intensive exercise.

Leveraging AI to build multiple choice questions quickly by feeding such huge content can save time and accelerate assessment process for teachers.

- Generative AI can be used to automate and simplify teacher's administrative work [4]. One scenario could be to assess student's performance based on their multiple assessment results and categorize the development area student falls into. This can be leveraged by teachers to focus on individual students according to their strengths and weakness.
- Intelligent tutoring systems aim to recommend teaching content and tasks that are appropriate for teaching needs [5]. For example, an AI classification system can be used to evaluate effective communication strategy to teach autistic students by analyzing their responses and attributes.

D. Negative Impact of Generative AI on Teachers

- There is a lack of practical testing of generative AI systems and some researchers have noted that their studies were limited by an insufficient number of participants and the short duration of the experiment [6]. So, teachers can't completely rely on such systems as their only mechanism till sufficiently proven.
- Lack of any criteria for evaluating the effectiveness of these systems [7], hinders the objectivity of evaluation and the beneficial development of the related technologies. This could be a serious concern leading to incorrect practical assessments.
- Teachers can also feel diminishing control over their teaching strategies and lose self-efficiency on relying heavily on such automated systems. To add, without understanding of the technology, the feeling of working with a black box can also discourage teachers to use them more effectively.

IV. CONCLUSION

The different use cases highlighted above related to translation, transcription, quiz creation and summarization can be used in the academic journey of students and teachers, especially who have access to online portals, study program that has interface with computers or generally available information systems for knowledge sharing. It can be used for the assisted or enhanced learning as well as teaching experiences. The generative ai can used a helpful aid in the academic journey.

The impact of generative ai on students and teachers in their academic journey is profound and it takes a long-term research and continued approach towards betterment of the generative ai usage. As a future research possibility, we can involve further in the experimental study on different set of classroom groups, subjects to have an in-depth analysis about the impact on education. Ethical considerations are an important factor to be evangelized across the education community, it not only includes plagiarism related practices but also the inherent nature of AI like bias, equity, privacy, legality and much more.

Have feedback mechanism to get better understanding of the educational impact, along with the regulation of existing

setups and platforms used by educational groups for this purpose.

Holistic involvement of the entire community including teachers, parents, students, administrative staffs, and other stakeholders in the ecosystem is critical. All of them need to participate in shaping up the future of generative ai in educational use cases. Future research can be carried out in one of the above specific areas to further the proposed solution.

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