

**AI in Product Management**  
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**Lecture- 11**  
**AI in Brainstorming & Idea Generation**

Welcome to this NPTEL online certification course on artificial intelligence in product management. Now we start with module 11, which is AI in brainstorming and idea generation. This is the first step of any new product development process. So in this part 3, which is AI for idea generation and marketing planning, we will talk about the various stages of new product development. This is module 11, and we are talking about AI in brainstorming and idea generation.

For new products and also for innovating existing products, in this module, we will explore the intersection of creativity, the creative process, and artificial intelligence. It begins with an overview of creativity and its stages and then integrates AI tools that enhance creative workflows. You will learn about brainstorming and how generative AI can facilitate idea generation. The module addresses ethical issues related to AI in creativity, such as intellectual property and authenticity. By the end, the participants and learners will understand how to effectively and ethically incorporate AI into their creative practices.

In today's fast-paced world, businesses are increasingly turning to artificial intelligence to enhance their creative processes. For instance, consider the popular clothing brand Stitch Fix, which uses AI algorithms to analyze customer preferences and trends. By leveraging data and machine learning, Stitch Fix can generate personalized clothing recommendations. So we will show it on the next slide.

Effectively merging fashion designs with advanced technology. So, this is how it is happening. The predictive algorithm helps stylists successfully serve the clients. So, here we have the client profile and historical interaction data with the client. This is merchandise data, and here we have algorithms, recommendation algorithms.

Now, based on this, this is called the proprietary styling cockpit. Based on this, we have curated personalized items, built deep client relationships, and added valuable context. Now, we have rich, meaningful, and highly actionable data. So, we have all this client

data, then we have merchandise data, and then we have feedback data. So, this is all about data that matters.

So, we know what the various likings and preferences of this client are. We know about our merchandise, and then we will get feedback on that, and then again we can move on to client data. This integration of AI not only streamlines the ideation process but also ensures that the design resonates with consumers. As more companies embrace AI in brainstorming and idea generation, it is crucial to explore how these tools can unlock new levels of creativity while considering the ethical implications involved. Now, we will start with the introduction to creativity.

Robert E. Franken defines creativity in human motivation as the tendency to generate or recognize ideas, alternatives, or possibilities that may be useful in solving problems communicating with others and entertaining ourselves and others. Human creativity often springs from making connections. We encounter something, whether it is a sight, sound, feeling, or a piece of knowledge, and this sparks the formation of ideas or opinions.

When we channel these connections into expressions, like writing a poem about a sorrowful event to convey its emotional weight to others, we engage in a deeply human form of creativity. In recent years, artificial intelligence has been revolutionizing the creative process across various industries, providing innovative tools that enhance human creativity rather than replace it. To illustrate this impact, we can examine a specific case study in graphic design. where AI-powered tools such as Canva's MagicWrite are reshaping workflows and inspiring new approaches.

So, this is how, so this is MagicWrite, use five or more words to describe, and this is how Canva MagicWrite works. So, that is the AI-powered writing assistant. Canva MagicWrite is a feature that uses AI to help you generate text for various purposes like social media posts, presentations, and even blog content. It analyzes the context you provide, like keywords or a brief description, and then creates relevant, coherent text based on that input.

So, input is when you give Magic Write a prompt or context specifying what type of content you need. So, the next step is processing. The AI processes your input. Drawing from its training data to generate suggestions. Now, it has given, write three points about how clouds form for grade 3 students.

Then comes the output; it produces a draft or ideas that you can customize and refine further. So, now it has given the answer to that. So, clouds form when the sun heats up water on the ground and in oceans, lakes, and rivers. The water evaporates and rises into the sky as water vapor, and as water vapor rises, it cools down. So, this is the answer to that question for a third-grade student.

The potential applications of AI are virtually limitless. Existing AI technologies already support diverse applications, including 1. Discovering sustainable building materials that are stronger and have lower carbon footprints than traditional concrete. Fashion designs showcased at prestigious events like the Metropolitan Museum of Art Gala. Artificial weather data generators for predicting climate change impacts.

Musical compositions are performed on major international stages. The creation of various forms of language includes narrative, poetry, computer programs, and news reports. The next is the creative process. The creative process is the journey of transforming an idea into its final form through a series of thoughts and actions. This process requires critical thinking and problem-solving skills.

Creative individuals typically navigate five key stages to realize their ideas. The first is preparation. The second is incubation. The third is illumination. The fourth is evaluation.

And the fifth is verification. These stages were originally described by Graham Wallas, a social psychologist and co-founder of the London School of Economics, in his 1926 book on creativity, 'The Art of Thought.' So, these are the five stages of the creative process. While every creative individual has their unique methods and thought processes, most creators subconsciously navigate these five stages during their creative journeys. These stages logically progress from one to the next.

Now, the first is the preparation stage. The journey begins with preparation and idea generation. In this initial stage, gather materials and conduct research that may inspire interesting concepts. Engage in brainstorming. Let your thoughts flow freely.

Or write in a journal to encourage divergent thinking. This approach helps to explore all possible angles of the idea. During this phase, your brain taps into its memory and past experiences to generate original thoughts. For example, a product manager is tasked with improving user engagement for a mobile app. They start by analyzing user data,

conducting surveys, and studying competitors to understand user needs and pain points. The second is the incubation stage. Once you have finished actively contemplating your

idea, it is time to step back. Part of the creative process involves temporarily distancing yourself from your concept. You might shift your focus to another project or take a complete break.

Although this may seem counterproductive, it is a crucial phase where your idea continues to develop subconsciously in the background. For example, after gathering insights, the product manager takes a break from direct brainstorming. They might go for a walk or engage in unrelated activities, allowing their mind to connect dots in the background. The third is the illumination stage, also known as the insight stage. Illumination is when the 'aha' moment occurs.

When new connections suddenly click and all the gathered information comes together, revealing a solution to your challenge. The moment can be unexpected but often arises after the incubation period. For example, while driving, the product manager suddenly thinks of a gamification feature that would enhance user engagement as a reward point for daily logins. The fourth is the evaluation stage. At this point, assess the validity of your idea and compare it with alternatives.

This reflective stage allows you to revisit your initial concept and determine if your solution aligns with your original vision. For professionals, this might involve conducting market research to gauge the idea's feasibility. For example, the product manager conducts focus groups to gather feedback. On the gamification concept, they also analyze potential implementation challenges and costs. Based on the feedback, they refine the feature, incorporating elements that users found most appealing. The fifth stage is the verification stage. So, at this final stage of the creative process, the hard work culminates. Your creative output could take various forms, be it a physical product, an advertising campaign, a song, a novel, or an architectural design.

In this stage, you finalize your project, bring your ideas to life, and share them with the world. For example, the product manager works with the development team to create the gamification feature. Sets up a marketing strategy for its launch and monitors its performance after release to assess user engagement metrics. Now let us look at the application of AI by Canva. So let us consider the example of Canva and how it integrates AI into its creative process.

So these are the five stages. Canva is a graphic design platform that empowers users to create a wide range of visual content, from social media graphics to docs, without needing extensive design skills. The engagement of AI tools enhances user creativity and

streamlines the design process. The preparation stage in Canva, that is the first stage. So we start with template suggestions.

So Canva uses AI to analyze user behavior and preferences to recommend templates. That align with their project goals. For example, if a user frequently designs social media posts, Canva will suggest relevant templates tailored to that context. This personalized approach not only saves time but also ensures that users can leverage design best practices. Effortlessly, the next step here is the content insight. So AI analyzes design trends across the platform to help users understand what styles and elements are popular, aiding in the preparation phase of creating appealing designs. The next comes the customization tools Canva offers. They are driven customization tools that allow users to modify templates easily.

Users can adjust elements such as font sizes, colors, and layouts with simple drag-and-drop functionality. The incubation stage in Canva starts with image recommendations. Users can upload images. AI tools suggest additional elements or enhancements, such as filters or graphics, that complement the existing content. The AI suggestions are based on both the uploaded content

and the overall theme of the project, ensuring that enhancements feel harmonious rather than arbitrary. So, this is a visual description of what we are talking about. The next thing that happens in the incubation stage in Canva is the smart design suggestions. While users work on their design, Canva's AI offers real-time suggestions for layouts, fonts, and color schemes that encourage users to explore different creative directions.

The next thing is the inspiration gallery. So, Canva's AI curates an inspiration gallery based on the user's ongoing projects. It highlights trending designs and successful projects from other users who share similar themes or styles. This gallery serves as a source of inspiration, encouraging users to push their creative boundaries.

Then comes MagicWrite. This AI-powered writing assistant can help users brainstorm ideas for captions, descriptions, and text elements based on their design context. This tool can spark inspiration and lead to new creative avenues. This tool enhances the cohesiveness of visual and contextual elements, ensuring a more integrated final product. So this is how it is happening.

So there are pictures and the text. Next comes design variations. Canvas AI can generate multiple variations of a design based on user inputs, allowing creators to see different

approaches and refine their ideas quickly. Idea mapping. The AI can assist in creating visual idea maps that outline different design concepts and their connections.

By visually organizing thoughts and concepts, users can better understand how their ideas relate to one another and identify potential areas for expansion. Now, what happens at the evaluation stage in Canvas? The first thing is performance analytics. So, users can track. As you can see here, users can track key performance indicators such as likes, shares, comments, and overall reach.

This form of data helps users understand which designs are most successful and why, allowing them to assess audience engagement and preferences. The next thing that happens here is sentiment analysis. So, Canvas can employ AI-driven sentiment analysis to evaluate audience reactions to published designs. By analyzing comments and reactions on social media or feedback received, the AI can gauge whether the responses are positive, negative, or neutral.

Next comes the learning resources and tutorials. Following the evaluation phase, Canva can recommend learning resources or design best practices based on insights gathered from user performance. At the verification stage, the first thing is about the collaboration features. So, Canva's collaboration tools allow multiple users to work on designs in real time, enhancing teamwork and creativity. As users make changes, AI facilitates version control by tracking edits and providing a clear history of modifications.

This ensures that collaborators can easily revert to previous versions if needed, reducing the chances of miscommunication or lost work. The next is the one-click export. So, AI plays a crucial role in this process by automatically checking that designs are correctly formatted, sized, and optimized for the intended output. This feature not only saves time but also minimizes the risk of errors. Allowing users to focus on creativity rather than technical details. The next comes the integrated feedback loop. After the export process, users can receive feedback on the performance of their designs in real-world applications. Now, let us look at AI and creativity.

The exploration of the interaction between artificial intelligence and human creativity raises intriguing questions about the nature of creativity itself. While AI has made impressive advancements in generating original content, such as art, music, and writing, its creative outputs are fundamentally different from those of humans. AI functions by analyzing patterns and data from existing works, producing results that are more

derivative than truly innovative. Examples of AI-generated design illustrate how these creations can impress audiences.

Human creativity is deeply rooted in personal experiences and emotional depth, allowing artists to convey meanings, evoke feelings, and forge connections with the audience. In contrast, AI operates through algorithms and data, producing outputs without understanding or emotional context. While it can analyze patterns and optimize design, it cannot replicate the intuition, spontaneity, and intentionality that characterize human creativity, highlighting the unique value of human artistic expression. AI can significantly enhance human creativity by acting as a valuable collaborator, providing product managers with fresh ideas and diverse perspectives. It encourages them to explore avenues they may not have previously considered.

This collaborative dynamic can lead to innovative solutions and groundbreaking outcomes, pushing the boundaries of what's possible in creative fields. By combining the analytical power of AI with human intuition and experience, teams can unlock new potential and drive more impactful results in their projects. Ultimately, while AI can play a significant role in the creative process, genuine creativity is fundamentally a human trait. The most promising future lies in the collaboration between human intuition and AI capabilities.

With each enhancing the other, this synergy has the potential to open new avenues of creativity, merging the strengths of both machines and humans to drive innovation and enrich artistic expression. The next comes AI and brainstorming. The term brainstorming was first coined by advertising executive Alex Osborne in the 1950s. He believed that a group of people could produce a greater number of creative ideas than an individual working alone. This concept has since been adopted and adapted in various fields, including product management, where it is used to foster innovation and drive product development.

Brainstorming is not just about coming up with as many ideas as possible. It is a structured process that requires careful planning, execution, and analysis. It involves a group of individuals who come together to discuss a specific problem or challenge and then generate a multitude of ideas to solve it. The ultimate goal of brainstorming is to stimulate creative thinking and encourage the free flow of ideas, thereby leading to the development of innovative solutions and strategies. Now let us look at brainstorming as an essential tool in product management.

Firstly, it promotes creativity and innovation, which are key to developing products that stand out in the market. By encouraging the generation of a wide variety of ideas, brainstorming allows teams to explore different possibilities and produce unique solutions. Secondly, brainstorming fosters collaboration and team building. It involves all team members in the decision-making process. Giving everyone a voice and a sense of ownership in the project.

As technology continues to advance, the ways in which we brainstorm are evolving. AI has the ability to analyze vast amounts of data, generate innovative ideas, and accelerate idea generation. By utilizing AI in brainstorming sessions, individuals and teams can save valuable time and resources while also producing a wide range of ideas and solutions that they may not have been capable of without it. AI can offer perspective with unlimited access to all the data.

This can help teams gain fresh insights and consider alternative viewpoints. It ensures that ideas won't be steered in a specific direction. According to a study by WeLand, brainstorming with a chatbot created more ideas on average as well as more diverse ones. This capability allows teams to explore a wider range of possibilities than they might generate on their own.

One key advantage of using AI in brainstorming is its ability to eliminate cognitive biases that often hinder creativity. By providing suggestions based on data rather than personal experiences or preconceived notions, AI encourages participants to think outside the box and consider unconventional solutions. This leads to richer discussions and more innovative outcomes. Additionally, AI can help structure brainstorming sessions by organizing ideas, prioritizing them based on relevance, and even identifying connections between different concepts. This organization allows teams to focus on the most promising ideas and develop them further.

However, while AI can enhance brainstorming, it is not a replacement for human creativity and collaboration. The most successful outcome arises when teams combine their unique insights and experiences with the capabilities of AI, fostering an environment where creativity can thrive. Ultimately, the integration of AI into brainstorming processes represents a powerful opportunity to unlock new ideas and drive innovation. Then we will look at generative AI and brainstorming.

So, product managers can leverage generative AI to significantly enhance brainstorming processes. First, there is idea generation. So, generative AI can streamline the creation of

extensive lists of potential product ideas or features tailored to specific criteria. For instance, it can analyze target audience demographics and identify user needs to suggest innovative solutions. Next comes concept visualization. AI tools can help product managers generate visual representations of product concepts, which helps in articulating their vision more clearly. This visualization helps to grasp complex ideas facilitating better understanding and encouraging collaborative discussions.

Competitive analysis. So, generative AI can analyze competitors' products and identify gaps within the market. This analysis provides valuable insights into what is currently available and what might be missing, allowing organizations to develop new product ideas or features that address unmet needs. By understanding the competitive landscape, product managers can position their offerings strategically and stay ahead of industry trends.

In market research, AI can systematically analyze market data and user feedback, uncovering insights that guide product ideation and decision-making. By employing a data-driven approach, product managers can ensure that their development efforts align with actual user preferences and market demands. To illustrate the potential, an article titled 'How Generative AI Can Augment Human Creativity' by Espion and Daniel. It shows how a flying car, which people have been trying to develop for more than 100 years without much success, must be designed.

The authors introduced Stable Diffusion, a generative AI model that produces unique photorealistic images from text and image prompts. This prompt: 'Design a product that can fly but also drive on the road, a flying automobile.' Stable Diffusion generated several designs, and the authors selected what they considered to be the most promising one: the vehicle in the lower right corner of the image on the next slide. So, these were the various images that were generated from this, and they selected this one.

Then the authors asked Stable Diffusion to take that design and reimagine the concept so that the car resembled a robo eagle. The image on the next slide shows the variation that the generative AI program quickly produced. From the top left design that looks most like a robo eagle to a more feasible concept of a flying automobile in the lower right corner. So, this is how it made all these images, and this was the most suitable one. A second example illustrates how designers can use such tools to collaborate on thematic variations of a structural design.

They begin with a flying automobile design generated by AI and ask the tool to produce versions that resemble a dragonfly, a tiger, a tortoise. And an eagle, so these are the various pictures that it came up with. An alternative approach is for human collaborators to use a tool like ChatGPT to develop details of the product and then use one like Stable Diffusion to obtain visual designs based on a series of prompts that build upon one another. The author gave ChatGPT a similar prompt to what the author gives to Stable Diffusion. Describe a product that can fly but also drive on the road. A flying automobile. ChatGPT provides the description.

The flying automobile is a sleek and futuristic vehicle that is built for the ultimate adventure. It has the appearance of a stylish sports car with smooth curves and a polished exterior but with hidden rotors that allow it to take flight. While the author gave the description to Stable Diffusion, it provided the images given on the next slide. So, this is what. Stable Diffusion came up with.

Next, the authors asked ChatGPT to reimagine the description to include the information that the product must resemble a dragonfly and have illumination markers for flying at night. It came back with the following. With its slender body, extended wings, and hidden rotors, the vehicle is reminiscent of a dragonfly come to life. The illuminated markers located along the wings and body create a stunning visual effect, helping to make the vehicle visible in the darkness. Stable Diffusion translated that description into various versions that maintained the feasible design and added elements of illumination based on the patterns of a dragonfly wings.

The images of that are provided here. Now let us look at the ethical issues in AI for creativity and brainstorming. The first is data responsibility and privacy. AI systems rely on large amounts of data to learn and generate content. Sensitive and personal data may infringe on intellectual property rights or violate privacy.

Responsible data management includes obtaining consent, using data transparently, and protecting it from misuse. Data should be diverse, inclusive, and of high quality to prevent biases and inaccuracies. The second ethical issue is that of fairness and diversity. AI systems should generate all individuals' AI systems should treat all individuals equally without discrimination or bias.

Generated content must reflect diverse cultures and perspectives, avoiding stereotypes and marginalization. Systems should be designed to embrace various forms of expression and communicate the richness of human experience. Efforts should be made to prevent

the exclusion of underrepresented voices. The next comes explainability and transparency. So, AI systems should clearly explain the reasoning behind their output and decisions.

Transparency requires that AI disclose the algorithms and methodologies used in its processes. Users should be informed about the data sources utilized for training and generating content. AI should openly communicate its limitations and uncertainties in decision-making. The next counts the value alignment and trust. AI systems must align with the values and preferences of their users.

They should not deceive. Manipulate or exploit users' vulnerabilities or emotions. Trust is built by ensuring AI does not harm users or the environment, maintaining respect and reliability in interactions. So, to conclude, the integration of artificial intelligence into the creative process marks a transformative shift in how ideas are generated, refined, and realized. Brainstorming sessions benefit significantly from generative AI, which can stimulate innovative thinking and facilitate collaboration among diverse participants. However, as we embrace these advancements, it is crucial to address the ethical issues that accompany AI's role in creativity. Ensuring fairness, diversity, explainability, and transparency will safeguard the integrity of creative expressions while fostering trust among users.

These are some of the sources from which the material for this module was taken. Thank you.