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COMMENTARY

DeepSeek's Chinese-Style Innovation Restores China's Educational Confidence

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1 Introduction

In early 2025, DeepSeek launched the open-source model DeepSeek R1, an outstanding technological innovation that marked a significant breakthrough in the field of AI due to its low cost and high efficiency. The technological highlights of this model cover multiple innovative aspects, such as reinforcement learning, the mixture-of-experts (MoE) model, knowledge distillation, and multi-head latent attention (MLA). DeepSeek excels at OpenAI o1 at a low cost and opens to the world. This not only injects new vitality into the development of global AI technology but also provides inspiration and far-reaching influence for the re-establishment of China's educational confidence and Chinese-style innovations. The launch of DeepSeek R1 is both a technological breakthrough and a profound reflection on educational concepts and practices. This commentary explores the logic underlying technological counterattack and reveals the educational elements behind its success, from the perspective of an education researcher and technology observer.

2 DeepSeek's Chinese-Style Innovation

DeepSeek's innovation is not restricted to the technical and product levels but lies in the profound educational value of technology. On February 10, 2025, *New York Times* published an article, titled *What DeepSeek's success tells us about China's ability to nurture talent*, which triggered extensive attention and in-depth reflection on China's education from all sectors at home and abroad (New York Times, 2025). For a long time, China's education has been misinterpreted as following the drill-and-practice method by the outside world. However, most of the core members of the DeepSeek team graduated from experimental science classes in key middle schools and completed their higher education at Chinese universities. Their success demonstrates the unique advantages of China's basic education in cultivating students' ability to solve complex problems and directly challenges the stereotype that China lacks top-notch innovative talents. This stereotype is in sharp contrast to the practice of many Chinese technology companies that seek talented employees educated abroad. This advantage is not only reflected in the integrated innovation research and competitive results of the field of AI, but is also fully demonstrated in the integrated innovation research in the field. China's education system is thus remarkably effective at cultivating high-quality and innovative talent and provides an example for the global education field. From the perspective of technological innovation, DeepSeek does not possess subversive AI technology. Instead, its innovative value lies in the ingenious design during the research process and the integration of multiple technologies, which results in equally powerful and slightly greater performance and significantly improves efficiency compared to existing AI models. DeepSeek's Chinese-style technological innovation inspires further advancement of the education system.

DeepSeek has dared to break the existing path dependence and attempt algorithm optimization. One of the basic principles of large language models is the scaling laws, also known as scaling law, which is regarded by the industry as the first principle in pretraining large models. Specifically, as the model size, dataset scale, and computing resources increase, the accumulation of computing power and data will bring greater returns, and the intelligence level of the model will also increase accordingly. However, with the continuous expansion of the model scale, each

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additional unit of a parameter or computing resource leads to a gradual decrease in performance improvement, and the phenomenon of diminishing marginal returns becomes obvious. DeepSeek has no reason and is unwilling to imitate and replicate existing methods. Therefore, DeepSeek modifies the available architecture, optimizes the algorithms, and creates a more streamlined and efficient model-generation paradigm. Moreover, DeepSeek considers local needs and extracts data value from China's unique cultural contexts, business scenarios, and social structures. For example, its adaptability in fields, such as dialect understanding, government service, and intelligent manufacturing, far exceeds that of international competitors. The company's practical strategy of defining technology by demands breaks the assumption that parameter piling is innovation and opens up China' s pragmatic path. DeepSeek has subverted the technical logic of the traditional AI track and reshaped the need for high computing power and capital for AI development models.

Notably, DeepSeek has chosen to completely adopt an open-source approach. By open-sourcing the core algorithm framework and development kits, the company has attracted more than 200,000 developers worldwide to participate in ecological construction. This open cooperation model not only reduces the usage threshold but also improves the speed and breadth of technological innovation. DeepSeek also focuses on applying technology to practical scenarios, thereby promoting the widespread application of AI technology in healthcare, financial services, and autonomous driving. This practice facilitates a rapid transformation from technological innovation to market application. DeepSeek founder, Wenfeng Liang, believed that people were standing on the shoulders of giants in the open-source community, tightening a few more screws for the building of domestic large-scale model. In the face of subversive technology, Moat AI formed by closed sources is short-lived. Even if OpenAI remains closed-source, it cannot prevent others from catching up. Liang's opinions reflect the underlying attitude and development strategy of adhering to the open-source approach and building an AI community ecosystem.

Open source involves transparency and the sharing of technology. The participation of developers from around the world will lead to a continuous source of motivation for technological progress. The widespread application of an open-source code library promotes a deeper integration of AI and Big Data technology and, in turn, gives rise to new business models and application scenarios. Therefore, open source is not only about technology sharing but also inspires innovation. DeepSeek values the power of global developers and, through the open-source approach, hopes to attract innovative ideas and technical solutions, gather the wisdom and ideas of global developers, and promote rapid technological iteration and breakthroughs. China's rich industrial application scenarios and the rich technical community ecosystem that spans the globe and transcends national boundaries can provide the space required for the next generation of technological innovations and breakthroughs. Every time DeepSeek releases a new version, it publishes papers, promotes open source, discusses its technical route, and then provides suggestions. By continuously attracting participants to jointly build an AI community ecosystem mainly based in China, DeepSeek aims to create a China-led AI community ecosystem. Moreover, the open-source model may change the entire industry landscape, allowing start-up companies and developers to gain a foothold in the competitive technological sphere. After all, technological breakthroughs often stem from initial attempts and continuous optimization processes, and open-source code libraries provide the most direct approaches to such attempts.

3 Demonstrating China's Educational Confidence

The ultimate goal of education is to cultivate talented individuals with innovative spirit and practical abilities. DeepSeek's adherence to the open-source approach, which breaks through the existing path dependence, is not only a technological breakthrough but also a profound reflection of and a display of confidence in the Chinese education system. The education system, which was once questioned and criticized, has unleashed its unique advantages and educational confidence under the accelerated catalyzation of the AI era. These advantages have not only laid a solid foundation for the long-term development of the country but also provided a continuous stream of talent support for enterprises that focus on scientific and technological innovation, such as DeepSeek. There are five prominent highlights of the Chinese education system, including the provision of solid basic mathematical knowledge and skills, the competitive environment in basic education, the close integration of higher education institutions and industry, the emphasis on cultivating practical and innovative abilities, and universal access to educational resources.

Concerning education, the core team members of DeepSeek generally have a solid mathematical foundation that supports them in algorithm optimization and model construction. It should be noted that although the competitive environment in China's basic education is a heavy academic burden, it

stimulates students' learning motivation and potential. Many outstanding students gain notice of their excellent learning abilities, strong psychological resilience, and innovative thinking throughout their learning experience. Notably, 85% of DeepSeek's team members graduate from science experimental classes in key middle schools, which provide a favourable environment and educational model for the growth of innovative talent. There is also a close cooperative relationship between higher education universities and industry.

Specifically, universities cooperate with enterprises on scientific research projects, internships, and other activities and thereby provide students with opportunities to encounter practical problems and challenges. This model enables students to cultivate their practical abilities and innovative thinking skills as well as adapt to their social development needs. DeepSeek's success benefits from this close integration of higher education universitiesand industry. Moreover, China's education system is gradually shifting away from traditional approaches to imparting knowledge and focusing on the cultivation of abilities and qualities. In elementary education and higher education, more attention should be paid to cultivating students' innovative thinking and practical abilities, such as math problem-solving, language learning, and scientific exploration. This shift not only improves students' learning efficiency but also reserves a large pool of talent for future scientific and technological development. A large number of positive explorations of technology-enabled education and universal access to educational resources have also been carried out. The Chinese government has continuously strengthened political and financial support, which enables high-quality educational resources to reach a wider range of regions and groups. The digitization of and universal access to high-quality educational resources not only helps narrow the urban–rural education gap but also provides more children with the opportunity to grow. DeepSeek's open-source strategy and low-cost deployment are also concrete manifestations of the cultural connotations upheld by Chinese education.

DeepSeek's rapid integration with and application in education at various levels further demonstrates the vitality and vigour of AI-enabled Chinese education. First, through algorithm optimization, DeepSeek reconstructs the educational discourse power and promotes AI equality. DeepSeek's technological breakthrough is essentially a revolution in education. Its original MoE-based architecture enables complex inference tasks to be completed after activating only 5.5% of the total parameters for a single inference. This innovative algorithm aligns with the perspective of using minimal effort to achieve maximum results and subverts technological determinism. The local teaching system developed by Shenzhen University in collaboration with Tencent Cloud allows students to use ten-million-parameter models for interdisciplinary experiments in the classroom. This university–industry collaboration approach reduces the cost of AI education by 87% and provides a technical possibility for educational inclusion. What is more remarkable is that DeepSeek's open-source technical architecture attracts over one million developers worldwide to participate in ecological construction, which results in a virtuous cycle of code co-construction, application feedback, and technology iteration. Zhejiang University has opened up teaching scenarios to 829 universities across the country through the China Education and Research Network authentication and resource-sharing infrastructure platform and has integrated DeepSeek into the entire disciplinary chain, from advanced mathematics to creative writing. This practice of technological equality breaks down the geographical barriers to traditional educational resources.

Second, through technology, DeepSeek has facilitated the reconstruction of education and achieved a qualitative leap from using intelligent technology as a tool to inspire thinking. The profound significance of this shift lies in its deconstruction of educational assimilation under the Western technological framework. Traditional AI courses mostly focus on programming skills, whereas DeepSeek courses emphasize application-orientated thinking. The essence of education is not to train AI operators but to cultivate technology philosophers. Shenzhen University has set up a philosophy of technology history course in its curriculum system so that students can study the evolution of AI within the grand narrative of the industrial and information revolution. In addition, through the generative art criticism course, students reflect on the cultural power behind AI-generated paintings. This educational design elevates technology learning to civilized thinking. Moreover, Shanghai Jiao Tong University integrates DeepSeek into advanced mathematics teaching and encourages flipped classroom instructional mode. This means that teachers stop focusing on formula derivations and, instead, begin guiding students to think about how algorithms can be optimized using AI. Students shift from solving problems passively to designing problems actively. This problem-based learning approach has greatly improved the efficiency of cultivating innovative thinking. Furthermore, the scenario-based course developed by Shenzhen University further expands the application of AI to real-world scenarios, such as educational courseware generation and self-media copywriting optimization, thereby moving from technology cognition to value creation. This new instructional mode, focusing on human–machine collaboration, not only allows for retaining technological efficiency but

also for maintaining humanistic warmth, thus achieving a balance between technological rationality and humanistic spirit.

Third, DeepSeek's success represents a leap from technological confidence to educational consciousness. When the DeepSeek R1 model achieves performance comparable to GPT-4 with one-tenth of the computing power cost, its significance has already gone far beyond the technological breakthrough itself. As Yi Rao, the former president of Capital Medical University, said, this was not only a scientific and technological achievement but also the greatest shock to human civilization by China in the past 185 years. This shock lies not only in the model's technological transcendence but also in its ability to break the closed loop of the dependence on education development led by Western technology. Three principles of technology for good, including inclusivity, transparency, and controllability, proposed by the DeepSeek team for the global AI ethics framework have been adopted by more than 30 countries. These principles enable China's transformation from a rule acceptor to a rule-making participant. When DeepSeek code runs in the laboratories of leading universities such as the University of Cambridge, it not only carries algorithms but also promotes a unique interpretation of technological civilization through Eastern wisdom.

4 Conclusions

The educational reform is triggered by the historical DeepSeek advancement in 2025, with technological innovation serving as the vanguard in transforming education from instrumental innovation to civilizational awakening. As Liang (2025) said, people were not making tools but forging a torch of thought that illuminated the future of humanity. Professor Mingyuan Gu (2017), a renowned educator, pointed out that true educational confidence did not lie in blindly negating others but in deeply understanding and fully carrying forward the internal logic of one's civilization. This educational confidence is not blind arrogance but is based on a profound understanding of culture and history, which innovation and development are based on. In the process of catching up with the global forerunners of science and technology, DeepSeek has successfully reconstructed and optimized China's educational system and fully activated the domestic potential. Its success demonstrates China's education system aims to cultivate talent as well as provide strong support for reestablishing China's educational confidence.

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