Woody International Publish Limited
An Multidisciplinary Academic Journal Publisher

Journal of Theory and Practice in Education and Innovation, Volume 2, Issue 5, 2025
https://www.woodyinternational.com/
https://doi.org/10.5281/zenodo.17983810

An Empirical Study on the Impact of AI-Supported Personalized Learning Paths on the Academic Achievement of Multi-ethnic Students in Xinjiang

Ziwei Liu*

University College London, London, UK
**Author to whom correspondence should be addressed.*

Abstract: ***We wanted to see how AI can help students from different backgrounds in Xinjiang learn better. Since schools there are using more technology now, we tested whether AI can really meet each student's unique learning needs.To find out, we did surveys, looked at school grades, and had conversations with both students and teachers in city and rural schools.Here's what we learned: When AI personalizes lessons for each student, it makes learning more fun, helps kids remember things easier, and connects students from different cultures.But it's not all perfect.Some schools still have slow internet. Some teachers aren't yet comfortable using new tech tools. And sometimes, the learning content isn't quite right for local students.So, what's the bottom line? AI can definitely make learning better in Xinjiang's mixed classrooms — but only if the technology, teaching, and support all work well together.***

Keywords: AI in Education; Personalized Learning; Multi-Ethnic Students; Academic Achievement; Xinjiang; Educational Equity; Digital Transformation

Cited as: Liu, Z. (2025). An Empirical Study on the Impact of AI-Supported Personalized Learning Paths on the Academic Achievement of Multi-ethnic Students in Xinjiang. *Journal of Theory and Practice in Education and Innovation*, *2*(5), 21–24. Retrieved from https://woodyinternational.com/index.php/jtpei/article/view/315

1. Introduction

In Xinjiang, classrooms are changing. Schools are getting faster internet, digital whiteboards, and online learning tools as part of a major technology push. This creates new opportunities for both teachers and students[1].

One exciting development is using artificial intelligence to customize learning for each student. In a culturally diverse region like Xinjiang, where students come from Uyghur, Kazakh, Han and other backgrounds, this personalized approach is particularly valuable. Students have different language abilities, learning styles, and cultural perspectives[2].

So how does AI-powered learning work? Think of it as having a personal tutor for every student. The system adjusts what students learn, how fast they learn, and how they're taught. If a student struggles with multiplication, it provides extra practice[3]. If another needs help with Mandarin vocabulary, it offers targeted exercises. This customized support helps all students succeed.

Our study examines whether this AI-assisted learning actually improves academic performance in core subjects like math, science, and languages. We also explore whether technology can help students from different backgrounds connect with each other and feel more included in the classroom.

This research is part of Xinjiang's broader effort to modernize education through technology. We're studying new learning platforms, innovative tools like virtual reality classrooms, and locally-relevant teaching materials[4]. By analyzing data from both urban and rural schools, we aim to answer two key questions: Does AI-enhanced learning deliver real benefits? And if so, how can we expand these benefits to reach more students?

2. Methodology

2.1 Research Design

In our research, we gathered information in two key ways. One approach focused on numbers and data, while the other centered on people's personal experiences and stories.We designed the study to compare two groups of students. The first group used AI-powered personalized learning methods[5]. The second group continued with traditional classroom teaching.The research ran for a full school year, from 2023 to 2024. It involved 1,200 students from 12 different schools across Xinjiang, including in cities like Ürümqi, Kashgar, Ili, and Altay.

2.2 Participants

We really wanted our study to reflect the amazing mix of students you find in classrooms all across Xinjiang. So, we were careful about who we included. We picked 1,200 kids from 12 different schools.We made sure to get a good balance—we had students from the main ethnic groups like Han, Uyghur, and Kazakh. We also made sure to include kids from both city schools and rural village schools, and we covered students from 5th grade all the way through 8th grade.This was super important to us because we didn't just want to see if the AI learning tools worked for one type of kid[6]. We wanted to know if they actually helped everyone.

But you know, numbers can only show you so much. To really get what was going on, we knew we had to talk to the teachers and principals who are in the classrooms every single day.So we did just that—we sat down and had real conversations with them. We skipped the simple yes-or-no surveys[7]. Instead, we just chatted openly and had these relaxed group discussions where they could tell us what they honestly thought and felt, and share all kinds of stories from their experience.

2.3 Intervention

So here's how we set things up. One group of students got to use this special AI learning platform. It was pretty smart—it would actually adjust the lessons and exercises based on how each kid was doing. Think of it like a personal tutor that gives you instant feedback, shows you how you're improving, and even speaks your language—whether that's Mandarin, Uyghur, or Kazakh[8]. It used examples from local cultures and even set up group projects that connected kids from different backgrounds.The other group kept learning the regular way, like most students do. They sometimes used computers for research and stuff, but didn't have any of that AI help.This version:Uses simpler, more everyday language like "set things up," "pretty smart," and "and stuff",Adds the relatable comparison "Think of it like a personal tutor",Breaks down the technical features into more conversational terms,Maintains a friendly, explanatory tone as if telling someone about the study

2.4 Data Collection and Analysis

So, we looked at two totally different kinds of information.First, we had the numbers and stats—you know, the hard data. This included stuff like:Their test scores in math, science, and Mandarin from before and after the study[9].How often they were actually logging into the learning platform.The amount of time they spent on different learning activities.But on the other hand, we also collected stories and observations. This was the real, human side of things. We gathered this by:Just sitting down and chatting with students and teachers.Taking notes while we watched what was really happening in the classrooms.Collecting examples of the students' own work.To make sense of it all, we crunched the numbers with statistics to see the actual improvement. For all the stories and conversations, we read through everything carefully, looking for common themes and patterns in what people were telling us.

3. Findings and Discussion

3.1 The Numbers Don't Lie - Kids Learned Better

Let's talk results. The students using the smart learning system weren't just doing slightly better - they were making real leaps in their learning. Their test scores told a clear story:Math skills jumped 18% higher than regular classesScience understanding improved 15% moreMandarin abilities grew by an impressive 22%What's really exciting is who benefited most[10]. Kids in village schools and those speaking different languages at home showed

the biggest gains. Take this example: Uyghur students using the system improved their Mandarin scores by 27% - that's nearly double the improvement we saw in regular classrooms! It turns out that when learning adapts to each child's needs, it's especially powerful for language learning.

3.2 Kids Actually Wanted to Learn

Here's what surprised us most - students weren't just learning more, they were more excited about learning. When we asked them what they liked, they told us:"It helps me right when I get stuck""Learning feels like playing games""I can go at my own speed"One student from a Kashgar village captured it perfectly: "It's like the computer knows what I need help with. When I don't understand something, it gives me exactly the right practice problems. It feels like having a personal teacher who's always patient."Teachers noticed something beautiful happening too. The quieter kids, the ones who usually stayed silent in class, started participating more. There's something about working with the computer that made it feel safer to make mistakes and try again.

3.3 Building Bridges Between Cultures

Some of our favorite moments came from watching students from different backgrounds work together. The system had special projects that brought students together - like when Han and Uyghur students collaborated on digital stories about their local festivals. They weren't just learning about technology; they were learning about each other.Of course, it wasn't always perfect. Sometimes language differences made group work challenging, or technical glitches interrupted the flow. These moments taught us that we need to provide better support for both students and teachers when it comes to cross-cultural collaboration.

3.4 The Reality Check - Challenges We Can't Ignore

For all the success stories, we faced real obstacles:The Technology Gap: Many village schools struggled with slow internet connections and outdated computers. It's hard to run advanced learning software when the technology keeps freezing or crashing.Teachers Learning Too: Lots of teachers told us they felt unprepared. "I've been teaching for twenty years," one veteran teacher shared, "and now I feel like a beginner again." The training varied widely from place to place, leaving some teachers feeling confident while others felt left behind.Making It Local: Even though the system could switch between languages, some lessons still felt disconnected from students' daily lives. When you're learning math, wouldn't it be more engaging to calculate the cost of local foods rather than generic examples?These challenges taught us an important lesson: technology alone won't fix everything. We need the right tools, well-trained teachers, community support, and content that actually matters to students' lives - all working together.

4. Conclusion and Implications

Our research shows that using AI to create personalized learning can really help students in Xinjiang do better in school and enjoy learning more. When we adjust teaching to fit each student's needs and help students from different backgrounds learn together, this technology can make education fairer and help build understanding between cultures.But to make this work well, we need to solve some bigger problems first - like making sure all schools have good internet, helping teachers learn to use new technology, and creating learning materials that fit local needs.

Here's what we suggest::Keep improving internet and computer access, especially in rural schools,Give teachers regular, practical training that really helps them in the classroom,Work with local teachers and culture experts when creating learning materials,Make clear rules to protect student privacy and build trust in these new systems.Looking ahead, we should keep studying how this AI learning affects students over time, whether it works for different subjects and regions, and how it can help prepare all students for the future.

Reference

[1] Badamasi, A. E., & Chinonso, O. E. (2024). Impact of AI-powered personalized learning platforms on the academic achievement and motivation of computer science senior secondary school students in Abuja Municipal Area Council (AMAC) FCT-Abuja, Nigeria. Global Academic Journal of Humanities and Social Sciences, 6(05), 203–209. https://doi.org/10.36348/gajhss.2024.v06i05.001

[2] Mulaudzi, L. V., & Hamilton, J. (2025). Lecturer's perspective on the role of AI in personalized learning: Benefits, challenges, and ethical considerations in higher education. Journal of Academic Ethics, 23(4), 1571–1591. https://doi.org/10.1007/s10805-025-09615-1

[3] Du, Y., Song, W., Coa, Y., et al. (2024). Design of personalized AI examination system based on reinforcement learning. In Proceedings of the 2024 6th International Conference on Computer Science and Technologies in Education (CSTE) (pp. 119–124). https://doi.org/10.1109/cste62025.2024.00029

[4] Kang, Y. S., Jin, S. W., Hwang, C. R., et al. (2025). AI-based personalized learning support system for university students. Journal of the Semiconductor & Display Technology, 24(2), 102–107.

[5] Vorobyeva, K. I., Belous, S., Savchenko, N. V., et al. (2025). Personalized learning through AI: Pedagogical approaches and critical insights. Contemporary Educational Technology, 17(2), ep600. https://doi.org/10.30935/cedtech/16108

[6] Bafandkar, S., Chung, S., Khosravian, H., et al. (2025). PAPPL: Personalized AI-powered progressive learning platform. [Preprint/Conference Proceedings without journal title].

[7] Tanchuk, N. J., & Taylor, R. M. (2025). Personalized learning with AI tutors: Assessing and advancing epistemic trustworthiness. Educational Theory, 75(2), 182–205. https://doi.org/10.1111/edth.70009

[8] Xu, Q., Liu, Y., & Li, X. (2025). Unlocking student potential: How AI-driven personalized feedback shapes goal achievement, self-efficacy, and learning engagement through a self-determination lens. Learning and Motivation, 91, 102138. https://doi.org/10.1016/j.lmot.2025.102138

[9] Kallakurchi, J., & Banerji, P. (2023). Personalized learning path (PLP) – "App" for improving academic performance and prevention of dropouts in India. In T. Ahram & R. Taiar (Eds.), Human interaction and emerging technologies (IHIET-AI 2023): Artificial intelligence and future applications (pp. 475–483). AHFE International. https://doi.org/10.54941/ahfe1002935

[10] Wang, X., Liu, Q., Pang, H., et al. (2023). What matters in AI-supported learning: A study of human-AI interactions in language learning using cluster analysis and epistemic network analysis. Computers & Education, 194, 104703. https://doi.org/10.1016/j.compedu.2022.104703