# Mandarin Translation of Executive Summary of *TPACK in the age of ChatGPT and GenAI (Mishra, Warr & Islam, 2023)*

*Translation by Claude AI. For verification purposes, the reverse translation back into English is provided at the end of this document.*

**您提供的内容的中文概要如下:**

这篇论文的作者认为,ChatGPT等生成式AI(GenAI)技术的兴起需要重新设想教学法技术内容知识(TPACK)框架的某些方面。TPACK描述教师有效将技术整合到教学中所需掌握的知识类型。

论文首先对GenAI进行了背景介绍,将其定义为可以生成新内容(如文本、图像或音乐)的AI。GenAI并非被明确编程来作出特定回应,而是从大规模数据集中学习和复制模式。论文总结了当前有关GenAI的教育话语,涉及作弊和偏见等话题。作者也对GenAI的益处表示了乐观。例如,它可以支持个性化学习和新的创造力形式。

接下来,论文深入探讨了GenAI的独特属性。理解这些属性对于发展教师需要有效利用GenAI的技术知识(TK)至关重要。与其他数字技术一样,GenAI具有变幻莫测、不透明和不稳定的特性。然而,它通过自然语言与各种数字媒体流畅互动的能力,以及其用于创造性和分析任务的广泛适用性,使其变幻莫测的本质被放大。它的不透明性源自其神经网络的复杂性。事实上,GenAI的某些方面甚至对其创造者来说也是无法理解的。它的不稳定性不仅源自错误,还源自其"幻觉"或生成不受约束的输出的倾向。

除了理解GenAI变幻莫测、不透明和不稳定的特性,教师还应考虑它独特的特性:具有生成性和社会性。GenAI具有生成性,因为它会创造原创、未预料到的内容,而不是检索预先存在的信息。事实上,它独立开发的创新能力令其开发者感到惊讶。GenAI也具有社会性,由于其会话性质,它会促进人格化和社会互动。论文认为,我们必须将GenAI视为一个具有生成性和社会性的"心理他者",而不仅仅是一个生产力工具。教师应将其视为一个专家但不可靠的合作者,它可以帮助完成复杂的概念任务,但其说谎的倾向需要警惕。

最重要的是,GenAI需要TPACK从将技术视为工具转变为认识用户与GenAI等社会化、具有生成性的技术之间的新生、互惠的互动。这些社会化、具有生成性的技术不再是被动的对象,而是积极塑造互动。学习空间现在包括一个非人类的、陌生的智能体。

由于GenAI的独特属性,TPACK必须适应。例如,教学法技术知识(TPK)可以涉及利用GenAI进行形成性评估,同时将总结性评估聚焦于高阶技能。技术内容知识(TCK)应该准备学生面对AI改变的职业。鉴于GenAI改造社会的潜力,情境知识(XK)的范围必须扩大。虽然XK传统上关注学校系统内的约束,但现在它也必须考虑AI在几十年时间尺度上的更广泛的个人、文化、政治和伦理影响。这包括对真理观念、对机构信任、心理健康和劳动力剧变的影响,学校需要应对这些影响。

作者使用一个重要的类比来描述生成AI对教育的潜在影响,就像社交媒体对教育的影响一样。他们认为,尽管最初专注于将社交媒体纳入课堂,但教育工作者没有考虑这些技术如何通过加剧两极分化、侵蚀对机构的信任和损害心理健康来对社会产生负面影响,而这些后果现已明显,学校必须应对这些挑战。作者警告,类似的动态可能会在GenAI身上重复,教育工作者会被留下来应对他们未料到的社会不良影响,而技术公司正在快速开发和部署这些工具。

作者认为,生成AI的兴起需重新构想TPACK框架的某些方面,以赋能教师合乎伦理地整合这项技术。更新TPACK需要承认这些工具是合作者而不是简单的生产力辅助工具。扩大情境知识(XK)涉及对长期社会影响进行预见。总体而言,TPACK必须从工具集观点转变为认识用户、情境和AI技术之间的新生关系。有了创造力和前瞻性观点,再加上日益强大的AI,教育工作者可以为所有学习者设计有变革意义的方法。这篇论文呼吁教师在这项不断发展并塑造文化的变革性技术中,积极主动地建立能力,以减轻不利后果并发挥其益处,而不是作出被动回应。

## Reverse translation back into English by Claude.AI

*(This version has been kept as is, for purposes of comparison with the original).*

The author of this paper believes that the rise of generative AI (GenAI) technologies like ChatGPT requires reimagining certain aspects of the Technological Pedagogical Content Knowledge (TPACK) framework. TPACK describes the types of knowledge teachers need to effectively integrate technology into teaching.

The paper first provides background on GenAI, defining it as AI that can generate new content like text, images or music. GenAI is not explicitly programmed to make specific responses, but learns and copies patterns from large datasets. The paper summarizes current educational discourses around GenAI, involving topics like cheating and bias. The author is also optimistic about the benefits of GenAI. For example, it can support personalized learning and new forms of creativity.

Next, the paper delves into the unique attributes of GenAI. Understanding these attributes is critical for developing the technological knowledge (TK) teachers need to effectively utilize GenAI. Like other

digital technologies, GenAI has capricious, opaque and unstable qualities. However, its ability to fluidly interact with diverse digital media through natural language, and its broad applicability to creative and analytical tasks, amplify its capricious nature. Its opacity stems from the complexity of its neural networks. In fact, some aspects of GenAI are inscrutable even to its creators. Its instability stems not just from errors, but also its tendency to generate unconstrained outputs or "hallucinations."

In addition to understanding GenAI's capricious, opaque and unstable qualities, teachers should also consider its unique attributes of generativity and sociality. GenAI has generativity because it creates original, unanticipated content rather than retrieving pre-existing information. In fact, its ability to independently develop novel innovations surprises even its developers. GenAI also has sociality, since its conversational nature promotes personification and social interaction. The paper argues we must view GenAI as a generative, social "psychological other", not just a productivity tool. Teachers should see it as an expert yet unreliable collaborator that can assist with complex conceptual tasks, but whose tendency to lie necessitates vigilance.

Most importantly, GenAI necessitates a shift in TPACK from viewing technology as tools to recognizing novel, reciprocal interactions between users and socialized, generative technologies like GenAI. These socialized, generative technologies are no longer passive objects, but actively shape the interaction. The learning space now includes a non-human, alien intelligence.

Because of GenAI's unique properties, TPACK must adapt. For example, technological pedagogical knowledge (TPK) could involve using GenAI for formative assessment, while focusing summative assessment on higher-order skills. Technological content knowledge (TCK) should prepare students for AI-altered careers. Given GenAI's potential to transform society, the scope of contextual knowledge (XK) must expand. While XK traditionally focused on constraints within school systems, it must now also consider AI's broader personal, cultural, political and ethical impacts over decades-long timescales. This includes impacts on conceptions of truth, institutional trust, mental health, and workforce upheaval that schools will need to address.

The authors use an important analogy to describe generative AI's potential impact on education, likening it to social media's impact on education. They argue that while initially focused on incorporating social media into classrooms, education failed to consider how these technologies could negatively impact society by exacerbating polarization, eroding institutional trust, and damaging mental health, consequences that are now evident and schools must address. The authors warn a similar dynamic may repeat with GenAI, leaving educators to deal with unanticipated societal harms as tech companies rapidly develop and deploy these tools.

The authors believe the rise of generative AI necessitates reimagining certain aspects of the TPACK framework to empower teachers to ethically integrate this technology. Updating TPACK involves recognizing these tools as collaborators rather than simple productivity aids. Expanding contextual knowledge (XK) means anticipating long-term societal impacts. Overall, TPACK must shift from a tools perspective to recognizing emergent relationships between users, contexts and AI technologies. With creative and forward-thinking perspectives, plus increasingly powerful AI, educators can design transformative approaches for all learners. The paper calls on teachers to actively build capacity in this disruptive, culture-shaping technology to mitigate downsides and harness benefits, rather than react passively.