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This study focuses on the use on innovative Tablet PC technology in learning and teaching mathematics. Specifically, the effects of incorporating Tablet PC technology in pre-service teachers' mathematics education were analyzed. The significant impact of technology use in mathematics education was assessed by evaluating and comparing students' final project and course grades. Grade performance of two groups of students was compared. One group was the treatment group where students extensively used Tablet PCs to work on mathematical investigations and explorations and to create lesson plans and animated games through PowerPoint presentations. The other group was the control group where students worked on identical mathematics investigations and created lesson plans without utilizing any technology. The outcome shows that the technology enhanced group achieved significantly higher scores than the control group. This outcome indicates a greater improvement in the treatment group' understands of mathematical content versus that of the control group's. Students from treatment group were more successful in passing the standardized test to acquire teaching license certification, were involved in active learning, and improved their self-efficacy. (Received September 19, 2007)