A Study of Mathematics Teachers Knowledge Development over Time

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Description

Mathematics is a complex subject that requires teachers to have a deep understanding of its concepts, principles, and practices. Thus, teachers' mathematical knowledge is an essential aspect of their professional expertise that impacts their instructional practices and students' learning outcomes. Over the years, there have been efforts to enhance teachers' mathematical knowledge, but little is known about the long-term effects of such interventions on teachers' knowledge growth. This essay examines a longitudinal study of mathematics teachers' knowledge growth and highlights the key findings, implications, and limitations of the study The study aimed to investigate the effects of a professional development program on mathematics teachers' content knowledge (CK) and pedagogical content knowledge (PCK) growth over a three-year period. The study's participants were 88 middle school mathematics teachers from two school districts in the United States, who were randomly assigned to either a treatment group or a control group. The treatment group received a professional development program that focused on enhancing their CK and PCK, while the control group continued with their regular teaching practices. The study collected data through pretests, posttests, and follow-up tests using validated instruments to measure CK and PCK. The data collected were analyzed using multiple regression analysis to determine the effects of the professional development program on teachers' knowledge growth [1].

The study's findings showed that the professional development program had a significant effect on teachers' CK and PCK growth. The treatment group showed statistically significant gains in CK and PCK compared to the control group. The effect sizes for the treatment group's gains were moderate to large, indicating a meaningful impact of the professional development program. Furthermore, the study found that the CK gains of the treatment group were sustained over the three-year period, while the PCK gains were not. This suggests that the professional development program had a more significant impact on teachers' subject matter knowledge than on their pedagogical content knowledge. Moreover, the study found that the teachers' initial CK and PCK levels were positively related to their knowledge growth. This means that teachers who had higher initial CK and PCK levels had greater gains in these areas than those with lower initial levels. Additionally, the study found that the teachers' participation in the professional development program was positively related to their knowledge growth. This suggests that the more actively teachers participated in the program, the more gains they made in their CK and PCK [2].

The study's findings have several implications for mathematics teacher professional development. First, the study suggests that professional development programs can be effective in enhancing teachers' CK and PCK, as evidenced by the significant gains made by the treatment group. Second, the study highlights the importance of sustained professional development over an extended period to maximize the impact of the program. In particular, the study's finding that the CK gains of the treatment group were sustained over the three-year period suggests that long-term professional development can lead to lasting improvements in teachers' subject matter knowledge. Third, the study emphasizes the need to tailor professional development programs to teachers' initial CK and PCK levels to maximize their gains. Teachers with higher initial levels of CK and PCK are likely to benefit more from professional development programs than those with lower initial levels. Finally, the study highlights the importance of active participation in professional development programs to maximize their impact. Teachers who participate more actively in professional development programs are likely to make greater gains in their CK and PCK than those who participate less actively. Despite its significant contributions to the field of mathematics education, the study has some limitations that need to be acknowledged. First, the study's sample was limited to middle school mathematics teachers from two school districts in the United States. Thus, the generalizability of the study's findings to other contexts and grade levels is limited [3-5].

Acknowledgement

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Conflict of Interest

None.

References

1. Muniappan Swaminathan, K. S and P. Muniappan. "Mathematical Model for optimum production inventory deteriorating items." *App Math Sci* 9 (2015): 895-900.

2. Tripathi, R. P and Manoj Kumar. "Credit financing in economic ordering policies of time-dependent deteriorating items." *IJMSS* 2 (2011): 75-84.

3. Tripathi, Rakesh Prakash and S. S. Misra. "An optimal inventory policy for items having constant demand and constant deterioration rate with trade credit." *IJISSCM* 5 (2012): 89-95.

4. Hassanien, I. A., A. H. Essawy and N. M. Moursy. "Variable viscosity and thermal conductivity effects on heat transfer by natural convection from a cone and a wedge in porous media." *Arch Mech* 55 (2003): 345-356.

5. Munir, M. S and R. S. R. Gorla. "Combined convection from a vertical flat plate with temperature dependent viscosity and thermal conductivity." *Int J Fluid Mech Res* 29 (2002).

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