Investigation of TPACK Confidence Perception of Prospective Elementary Mathematics Teachers

DOI= http://dx.doi.org/10.17556/jef.04990

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Extended Summary

Purpose
The aim of this study was to determine prospective mathematics teachers’ confidence level regarding Technological Pedagogical Content Knowledge (TPACK) and to examine whether prospective teachers’ TPACK confidence levels differs with respect to gender, grade levels, computer ownership, computer usage frequency and level of technology use.

Method
This research was designed using descriptive and correlational survey model. The study group consisted of 527 prospective elementary mathematics teachers (Female= 355, Male= 170 and Missing= 2). The data were collected in the Spring semester of 2012-2013 term. In the research data were collected through “Technological Pedagogical Content Knowledge Confidence” scale developed by Graham et al. (2009) and translated into Turkish by Timur and Taşar (2011). The demographic information of prospective mathematics teachers collected through a “Demographic Questionnaire” developed by the researchers. TPACK confidence scale was developed for science teachers related to use of technology in science and technology course. In this study this scale was adapted to mathematics course to determine prospective mathematics teachers’ TPACK confidence level related to use of technology in mathematics education. For this reason, exploratory and confirmatory factor analysis was conducted. As different from the original scale, technology knowledge was discussed under two dimensions: Basic Technology Knowledge (BTK) and Advanced Technology Knowledge (ATK). In the data analyzes process the descriptive statistic and F test was used. A result of Bonferroni
correction significance level (α) was determined .01 (Abdi, 2010). In addition, the effect size was calculated to reveal the practical significance of the results (Ozsoy and Ozsoy, 2013).

**Results**

In the study it was found that prospective mathematics teachers felt quite confident on their TPACK confidence. In the subscales it was determined that they had fairly confident on the TPACK, TCK and ATK subscales and quite confident on BTK and TPK subscales.

The results of the study also showed that the prospective mathematics teachers’ TPACK confidence didn’t differ with regard to gender. Also, the gender was not a significance factor in subscales, TPACK, TPK, and TCK, BTK. The only significance difference was in their ATK between males and females. Another similar result of this study was that the prospective mathematics teachers’ TPACK confidence didn’t differ with regard to grade levels for all scale and subscales. The prospective teachers’ TPACK confidence levels differed significantly between computer ownership and computer usage frequency excluding TCK and BTK. Moreover, the results of the study showed that there were significance difference between level of technology using.

**Discussion and Conclusion**

The study results showed that the prospective mathematics teachers felt quite confidence about their TPACK. When analyzed similar researchs it was determined that teacher candidates who were studying in different departments had TPACK confidence and self-efficacy (Gomleksiz and Fidan, 2011; Kaya et al., 2011; Sancar Tokmak et al, 2013; Yavuz Konokman et al., 2013; Yurdakul Kabakci, 2011). Another results of the study showed that there were no significance difference between gender. This result was parallel to other studies in literature (Akgun, 2013; Gomleksiz and Fidan, 2011; Kaya et al., 2010; Kaya et al, 2011; Kazu and Erten, 2011; Koh and Sing, 2011; Sancar-Tokmak et al., 2013).

One of the results of this research was that there was no significant difference on grade levels. In their study Kazu and Erten (2011) concluded that teacher candidates opinions related to Web Pedagogical Content Knowledge did not differ significantly according to their grade levels. Similarly the results of the Sancar-Tokmak et al. (2013)’s study showed that there were no significance difference between 2nd, 3rd, 4th grade level teachers candidates in terms of their TPACK confidence. On the other hand, in this study it was found that the prospective teachers’ TPACK confidence levels differed significantly between computer ownership in many subscales. Yavuz Konakman et al. (2013) determined that teacher candidates with high levels of access to technology had higher levels of TPACK. The results of computer usage frequency obtained in this study was similar to the results of Baki (2008) and Demiralay and Karadeniz (2010)’s studies.

In this study it was only discussed four of the components in the TPACK
framework and not discussed pedagogy, content and pedagogical content knowledge. In this context, developing appropriate data collection tools prospective teachers’ content knowledge, pedagogical knowledge and pedagogical content knowledge can be examined.