Chapter 7
Exploring Technological Knowledge of Office Data Processing Teachers:
Using Factor Analytic Methods

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ABSTRACT

This study applied factor analysis for exploring technological knowledge of beginner and veteran Office Data Processing (ODP) teachers at Further Education and Training (FET) or Technical and Vocational Education and Training (TVET) colleges in South Africa. These ODP teachers use Information Communication Technology (ICT) in the technology-enhanced classrooms. The Mishra & Koehler (2006) Technological Pedagogical Content Knowledge (TPACK) framework was extended by replacing Technological Knowledge with Procedural Functional Knowledge (PrFK) to realise the PrFPACK theoretical framework that enabled the researchers to holistically explore the contextual technological knowledge of teachers in the digital classroom environment. We developed an inventory of 65 comprehensive measures based on the PrFPACK framework and validated the inventory on a dataset of responses from 107 ODP teachers. The findings of this study generally revealed that Procedural Functional Content Knowledge is the most important factor in explaining the technological knowledge of ODP teachers.

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INTRODUCTION

Helping beginner and veteran teachers develop technological knowledge and skills in how to use new technologies to teach is a critical component of teacher preparation in this digital age (National Council for Accreditation of Teacher Education [NCATE], 2010). Existing research indicates that a critical factor influencing beginner teachers' adoption of technology is the quantity and quality of technological knowledge and experiences included in their teacher education program (Agyei & Voogt, 2011; Tondeur, Van Braak, Sang, Fisser & Ottenbreit-Leftwich, 2012). Today's teachers should develop lessons that teach learners content knowledge and assist them to develop twenty-first century skills so that they can think effectively, actively solve problems, and be digitally literate. The preparation of teachers in the educational uses of technology in the current digital age appears to be a key component in almost every improvement plan for education and educational reform program (Davis & Falba, 2002). According to Gess-Newsome & Lederman (2003), while some issues in education take on the flavor of social and historical context, others, such as how to prepare beginner and experienced teachers to integrate technology for effective teaching and learning in the current digital age, remain almost ill-defined. Most importantly, research evidence shows that in spite of many efforts that researchers and educational institutions have invested over the years in preparing both beginner and experienced teachers in the educational uses of technology, pre-service (beginner in this study) and in-service (veteran in this study) teachers still lack appropriate skills and knowledge needed to be able to successfully use technology to teach (Uwameiye & Adegbenro, 2007). According to Meskill, Mossop, DiAngelo & Pasquate (2002), this is not necessarily the case, finding that new teachers appear to be affected by the existing culture of the teaching profession. While beginner teachers may be more conversant with technology in their daily lives than veteran teachers, they are not exposed to ideas about how to integrate technology in classroom settings.

Although some research reported that teachers' experience in teaching did not influence their use of information communication technology (ICT) in teaching (Niederhauser & Stoddart, 2001), more research showed that teaching experience influenced the successful use of ICT in classrooms (Williams, 2003; Gorder, 2008; Cubukcuoglu, 2013; Ndibalema, 2014). In particular, Gorder (2008) reported that teacher experience is significantly correlated with the actual use of technology. Lau and Sim (2008) conducted a study on the extent of ICT adoption among 250 secondary school teachers in Malaysia. Their findings revealed that experienced teachers frequently use computer technology in the classrooms more than the beginner teachers. This result implies that teachers' ICT knowledge and skills in relation to the successful implementation of ICT as pedagogical tool (Pierson, 2001) is complex and not a clear predictor of ICT integration in teaching and learning. In addition, Kumar & Kumar (2003) argue that lack of adequate training and experience is one of the main factors why teachers do not use technology in their teaching.

The Further Education and Training (FET) colleges in South Africa currently have greater access to educational technologies than has been the case in the past. In addition, much investment has been made in the acquisition of ICT infrastructure in these colleges where vocational and technology-based subjects are being offered for the purpose of artisan skills development. However, very little is known about what forms of technological knowledge and skills are needed by Office Data Processing (ODP) teachers for effective teaching and learning. It is in this sense that in this study we explored the technological knowledge of ODP teachers at FET colleges in South Africa. We explored the technological knowledge of ODP teachers in the specific domains such as Microsoft Word program, spreadsheet application, audio typing, PowerPoint presentation, Interactive Teaching Box (ITB), Web technology, and data projector application. The teaching of these applications in FET colleges is in line with the new