Techno-Stress of Teachers: An Empirical Investigation from China

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Abstract. The purpose of this study is to explore the consequences and interrelations among techno-stressors, techno- and work-exhaustion in Chinese teachers. For this purpose, an empirical study with 272 teachers in China was carried out. Results indicate that techno-induced role ambiguity and techno-change frequency have a direct impact on techno-exhaustion. Our results also reveal that both work-exhaustion and techno-exhaustion negatively impact job satisfaction and teacher retention; meanwhile, techno-exhaustion indirectly causes work-exhaustion. Then discussions of Techno-stress management strategies were discussed in this paper.

Introduction

Nowadays, following the swift development in technological devices, especially in Information Technologies (ITs), technology is often integrated into every field. However, IT, while convenient and efficient, also brought some new problems to teachers, notably techno-stress. In the past few years, more and more scholars have begun to focus on techno-stress. Existing research from different perspectives has discussed the generation of technical pressure (why individuals perceive the pressure of technology) \cite{1,2}, the causes of technical stress \cite{3,4} and its results \cite{5,6,7,8}, as well as the way in which techno-stress addressed \cite{9}.

In recent years, education has received a large amount of investment in technology from the government, which changes required competencies in teaching. Teachers are expected to use technology such as multi-media and digital textbooks, which is considered basic skills for teachers in this digital era.

However, the research on teachers’ techno-stress is rare. This paper attaches great importance to techno-stress on teachers. The required data was obtained through questionnaire and empirical test of techno-stress influence on work results and investigated with structural equation modeling. We conclude with a simple discussion of the result and further research plans.

Background and Hypotheses

Work Outcomes: Job Satisfaction and Turnover Intention

Previous studies have demonstrated that employee exhaustion has an impact on work outcomes and employee turnover, which means employees resigning or changing their employers \cite{10,11}.

Over the last decades, turnover in various occupations has been analyzed and discussed from different perspectives using different methods. All studies share the same thing: the root cause of employees quitting a job is the turnover intention, which is closely related to job satisfaction \cite{12,13}.

H1: The higher teachers’ job satisfaction, the lower the turnover rate.

Work Strains: Techno- and Work-exhaustion

Work stress is a stress reaction caused by work itself or work-related factors, such as work overload, time pressure, unfavorable working environment, and so on. Those employees who constantly under long-term pressure would suffer from work-exhaustion.

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“Techno-stress” was proposed by psychologist Craig Brod in 1984[14]. Most scholars advocated that techno-stress is a negative direct or indirect impact on the physiological, behavioral and psychological changes of the user, and it can manifest in the form of physical and emotional exhaustion.

Work- and techno-exhaustion can prompt employees to re-examine their work environment and career development. Pressure-overload will reduce employee's job satisfaction and increase the turnover intention. In addition, research suggests that techno-exhaustion and work-exhaustion influence each other, for work-exhaustion is partly caused by using IT in daily work.

H2: The higher the teachers’ work-exhaustion, the lower the job satisfaction (a), as well as the higher the turnover intention (b).

H3: The higher teachers` techno-exhaustion the lower the job satisfaction organizational (a), as well as the higher the turnover intention (b).

H4: The higher teachers’ techno-exhaustion, the higher the work-exhaustion.

Techno-stressor

Current techno-stress research has found that IT forces employees to work more and faster [15]; meanwhile, with the accelerated pace of IT upgrades; employees have to spend more time in studying new IT knowledge. This has further led to role ambiguity, a perceived lack of clarity about whether one has to deal with technology-related problems or work activities. Techno-induced role ambiguity and techno-change frequency are discussed as major sources of techno-exhaustion.

H5: The higher teachers’ techno-induced role ambiguity (a), as well as techno-change frequency (b), the higher the techno-exhaustion.

Based on these hypotheses, Fig. 1 presents our research model of techno- and work-stress.

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**Figure 1. Research Model of Techno-stressor and Work Results.**

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**Research Method**

**Variable Measurement**

The scale used in this study mainly includes three aspects: stressor, stress, and work outcomes, all the items are used Likert’s 7-point method. 1 means that the individual strongly disagreed and 7 means that the individual strongly agreed in the measurement of stressors and work results. The index of stress is 1(never) to 7(daily). At present, although the problem of techno-stress has been put forward for many years in Western countries, research on it remains at the academic level, and it is still emerging as a new concept in China. The research of Chinese teachers’ techno-stress in this paper is based on the above understanding and the present overseas production, following translation and back-translation procedures to derive a questionnaire. Latent variable source and item were shown in Appendix, Table 1.
<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Techno-stressor</td>
<td>I am unsure what to prioritize: dealing with IT problems or my work activities.</td>
<td>Ayyagari et al.</td>
</tr>
<tr>
<td>Technology-Induced Role</td>
<td>I can NOT allocate time properly for my work activities because my time spent on ITs-activities varies.</td>
<td></td>
</tr>
<tr>
<td>Techno-Induced Role Ambiguity, TRA</td>
<td>Time spent resolving IT problems takes time away from fulfilling my work responsibilities.</td>
<td></td>
</tr>
<tr>
<td>Techno-Change Frequency, TCF</td>
<td>There are constant changes in computer software in our organization.</td>
<td>Agho et al.</td>
</tr>
<tr>
<td></td>
<td>There are constant changes in computer hardware in our organization.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There are frequent upgrades in computer networks in our organization.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I often find it too complex for me to understand and use new technologies.</td>
<td></td>
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<tr>
<td></td>
<td>Due to the development of IT, I often find myself worrying.</td>
<td></td>
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<tr>
<td></td>
<td>Due to the development of IT, my mood often goes up and down.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Due to the development of IT, I suffer from nervousness.</td>
<td></td>
</tr>
<tr>
<td>Work-Exhaustion, WE</td>
<td>I feel emotionally drained from my work.</td>
<td>Moore</td>
</tr>
<tr>
<td></td>
<td>I feel used up at the end of the work day.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I feel fatigued when I get up in the morning and have to face another day on the job.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I feel burned out from my work.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I feel busy or rushed.</td>
<td></td>
</tr>
<tr>
<td>Techno-Exhaustion, TE Job</td>
<td>I feel drained from activities that require me to use ITs.</td>
<td>Ayyagari et al.</td>
</tr>
<tr>
<td></td>
<td>Working all day with ICTs is a strain for me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I feel burned out from my ICT activities.</td>
<td></td>
</tr>
<tr>
<td>Work satisfaction, Job</td>
<td>My job is enjoyable.</td>
<td>Thatchher et al.</td>
</tr>
<tr>
<td>Turnover Intention</td>
<td>I often consider resigning.</td>
<td>Maier et al.</td>
</tr>
<tr>
<td></td>
<td>I have the idea of leaving my present job.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I'm thinking about leaving the present job.</td>
<td></td>
</tr>
</tbody>
</table>

**Data Collection**

We collected data to evaluate our research model by conducting a field survey. There are 338 Chinese teachers who teach 12 different disciplines such as Chinese, mathematics, English, music, science, chemistry, physics, and history from primary and secondary schools and participating in this study. All teachers use computers, smart boards, and tablet computers for educational purposes. Finally, through discounting invalid questionnaires, there were 272 valid questionnaires left. In addition, 236 of these teachers are female (86.76%) and 36 of them are male (13.24%).
Research Method

SPSS 20.0 was used in this research, and the reliability and validity of the questionnaire were tested. Structural equation modeling (SEM) enjoys great abilities to treat measure error, and serves as a strong tool for measuring latent variable and verifying the causality models in management research. In studying teachers’ techno-stress, this paper establishes structural equation modeling by using the AOMS17.0 to confirm and revise the supposition and theory model.

Research Results

Measurement Model

Measurement items used in prior research ensured content validity. The reliability of the six constructs—techno-induced role ambiguity, techno-change frequency, techno-exhaustion, work-exhaustion, job satisfaction, and turnover intention — was calculated on the combined sample. The Cronbach’s alpha values were 0.746, 0.893, 0.886, 0.909, 0.867 and 0.903.

Structural Model

We observed the relationships among techno-stressor, techno- and work-exhaustion, job satisfaction, and turnover intention. The results of the structural equation modeling (SEM) analysis show that the fit indices are satisfactory (Table 2), and the path coefficients are significant (Figure 2).

<table>
<thead>
<tr>
<th>Fit index</th>
<th>NNFI</th>
<th>IFI</th>
<th>CFI</th>
<th>RMSEA</th>
<th>AGFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>0.909</td>
<td>0.922</td>
<td>0.921</td>
<td>0.064</td>
<td>0.813</td>
</tr>
</tbody>
</table>

As indicated by path coefficients, in order to more clearly describe the strength of effect of work-exhaustion and techno-stressors and exhaustion on work-related results, we calculated the strength of effect of each. Based on the results, we can conclude that techno-induced role ambiguity and techno-change frequency contribute significantly to teachers’ techno-exhaustion. Work-exhaustion significantly affected job satisfaction and turnover intention. In addition, techno-exhaustion significantly influences job satisfaction and turnover intention. Finally, turnover intention is influenced by job satisfaction. The result of the data analysis indicated that 5 hypotheses are fully supported.

***P<0.01, **p<0.05, *P<0.1.

Figure 2. Research Results of Path Coefficients.
Discussion

Techno-stressor and Techno-exhaustion

Previous research defined and validated that several factors influence techno-stress of different groups, but teachers as a group were not evaluated. Due to IT usage and development in education, teachers have spent more time learning or adopting new technology or preparing electronic lectures. In this research, we theorize that for teachers, techno-induced role ambiguity and techno-change frequency are contributing factors for techno-exhaustion.

Techno-exhaustion and Work-exhaustion

The development of IT is an important cause of modern social work-exhaustion, which can cause huge losses to economic development [2]. Previous studies have shown that techno-stress and work-stress effect work results independently, but this study suggests that techno-exhaustion significantly affects work-exhaustion. This means that techno-exhaustion is likely to be an important contributing factor to work-exhaustion.

Techno- and Work-exhaustion and Work Results

Our results confirm prior research that work-exhaustion is one of many factors contributing to teachers’ turnover and reduces their job satisfaction. In addition, we discussed the influence of work-exhaustion based on a well-known research model theorizing job satisfaction as the most influential indicator of turnover intention. We find that work-exhaustion and job satisfaction significantly influence turnover intention and its antecedents, and argue that work-exhaustion should be included in theories and models explaining teachers’ turnover. We also proved the techno-exhaustion had the same effect on teachers’ turnover and job satisfaction with work-exhaustion.

Conclusion

The use of technology is meant to make work expedient and efficient. In light of this, IT is commonly used in education. But there are some negative points such as techno-stress which come as a price of technology. In this paper, factors causing techno-stress on teachers were investigated. The study identifies techno-stressors of teachers as contributing factors for techno-exhaustion. Moreover, we reveal that techno-exhaustion is a significant factor causing work-exhaustion on teachers. In addition, both work-exhaustion and techno-exhaustion have a profound influence on teachers in terms of low job satisfaction, as well as high turnover intention.

Techno-exhaustion will dramatically reduce productivity, which has a major impact on the development of teachers. Our research found that teachers’ techno-exhaustion is mainly due to difficulties in adapting and mastering new technologies. This shows that as long as teachers can grasp IT, it will help relieve stress and exhaustion. We suggest that school administrators should help teachers finish their work by improving targeted training plans, which focus on reducing techno-stress - for example, online real-time technical support service - which can solve technical issues for teachers immediately. Schools can establish a positive emotional management system where teachers are pleased to accept new technology and reduce the impact of negative emotions.

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References


