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Development and Factorial Validation of a Time Management Scale for Students

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Abstract: *Time management is a very important factor that predicts a student's academic success and overall mental health, thus an effective system for managing time is critical to a student being successful. The purpose of this study was to develop and validate an instrument to assess the time management behaviors of university students in Pakistan. To achieve this goal, two phases were conducted. The first phase involved generating an item pool by deductive reasoning, having experts review the items and the modifications were made accordingly. The second phase consisted of a cross-sectional study using a sample of university students (340) to collect data for factor analysis (exploratory factor analysis (EFA) and confirmatory factor analysis (CFA)). The Kaiser-Meyer-Olkin measure was (.80) and the results of a Bartlett's test of sphericity were significant, thus indicating that the sample was adequate to conduct a factor analysis. After EFA four factors were retained. Later on, CFA demonstrated strong fit indices (GFI=951, CFI =951, TLI=916) for the four-factor model that were labeled as: Goal Setting, Prioritization, Time Estimation, and Planning. Overall, results indicate that the TMS appears to be a reliable and valid measure that can be used for assessing time management behaviors in academic settings.*

Keywords: Time Management, University Students, EFA, CFA

Introduction

Time management is considered as a way of managing yourself through how you prioritize your tasks, make use of the time you have in the most efficient manner possible, and determine when specific activities are best done (Kibebsii & Chufi, 2022, 2016). Jenaabadi et al. (2016) conducted research that showed that students who effectively manage their time have lower levels of anxiety and perform better academically. The idea that good time management leads to success has been around for hundreds of years and remains true today (Pugh & Nathwani, 2017; Nasrullah & Khan, 2015). Frederick Winslow Taylor's use of time and motion studies to improve employees' efficiency and reduce wasted time is where the concept originated (Kibebsii & Chufi, 2022). In the highly competitive workplace we face today, managers and organizations are looking for tools that help with time management and ultimately lead to improved performance from their employees (Kumar & Aithal, 2019). Understanding this, researchers believe that time management practices should be introduced during the student face (Valle et al., 2016). Time management comprises several behaviours that are geared towards achieving goals through the effective use of time (Aeon & Aguinis, 2017). Aeon and Aguinis (2017) state that there are three main focus areas for time management: attitudes about time, long-term planning, and short-term planning.

Time attitudes are closely related to academic achievement (Nieuwoudt, & Brickhill, 2017). The use of long-range planning helps individuals with the ability to perform tasks in a timely manner and do routine work over an extended period of time. Short-range planning is typically associated with organizing a specific subset of tasks (daily, weekly, etc.) to meet time constraints.

Positive academic performance (Razali et al., 2018) has been linked to effective time management behaviours. Students with effective time management skills are better able to complete their course work and

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meet learning objectives. Nadinloyi et al. (2013) and Kharadze et al. (2017) conducted studies that demonstrated a close relationship between time management and academic performance. As students deal with the demand of college education -goals, fluctuating academic workload, and the balancing of work/life-effective time management can act as an effective coping strategy (Nadinloyi et al., 2013; Kharadze et al., 2017). The result of achieving this balance falls predominantly on the student with many identifying their curriculums as not providing adequate inherent support. Evidence exists in the literature regarding the benefits of time management among college students (Kearns & Gardiner, 2007; Kelly, 2002; McKenzie et al., 2004) with greater time management ability associated with improved academic achievement. Krause & Coates (2008) further suggest that a student's ability to manage time effectively serves as a key indicator for developing stronger study habits and achieving academic success. People can organize and manage their activities with the help of time management (Claessens et al., 2004).

Furthermore, the basis for students' development of excellent study habits and methods for success is their ability to manage their time well. People can organize and manage their activities with the help of time management (Claessens et al., 2004). Furthermore, Wang and colleagues (2011) have demonstrated that time management skills are crucial outside of academic settings, as research indicates that effectively managing one's leisure time significantly improves an individual's overall quality of life. Administratively and academically, web-based education differs greatly from traditional classroom instruction in the area of time management. In formal schooling, there were certain learning opportunities that included explanations of every aspect (Nieuwoudt & Brickhill, 2017). Under this technique, teachers are in front of the students and are free to ask any question, without holding back or reluctance. Nonetheless, in contrast to traditional learners, remote learning students do not experience this kind of learning environment. In online learning, there is clearly a documented physical distance between the teacher and the learner (Ahmad & Ch, 2017). As a result, time management and achieving high grades in distant learning are more difficult. Online learning often requires students to piece together information from various sources, leaving gaps that they need to fill through independent exploration (Broadbent, 2017). Time management is a crucial skill for online learners, impacting their success in both academic and personal domains (Broadbent, 2017). However, many students struggle with this art. This ineptitude can manifest as a vulnerability to distractions and a tendency to procrastinate on developing effective time management strategies.

Literature Review

Time management has yet been defined as a subject of debate: Some people will consider it a function of taking or keeping time control, whilst others see it more as a method to get future events to occur as planned. Eilam & Aharon define time management as the ability to arrange for… manage your time by using methods, so that you can achieve what you want out of it (2003). The most widely accepted view of time management hails from Crutsinger, who defines time management as "a set of skills that enable you to focus on important tasks for specific periods of time, allocate your time to those tasks effectively, develop your own individualized time management style, and adjust for changes that may require you to change the way you manage your time" (1994). There are many researchers looking at time management as a form of self-management where individuals can create a sense of control in the activities they manage, having completed them, and achieve the results they desire (Lakein, 1973; Soucie, 1986). Time management is not; in any way shape or form, altering the flow of time (Eilam & Aharon 2003). Time Management, therefore, is simply taking control of how we view time and manage it within our approach to time. Time management is seen as a method…a system, to improve upon your emotional disposition, reduce your stress, and give you a more significant level of control over the life that you live. (Taylor & Mackenzie 1986, Emanuel 1982, and Lakein 1973) Time management principles as outlined above have been promoted widely in the literature; however, more notably, academic research studies have often been limited in quantifying and determining the effectiveness of the use of time management principles/systems as a legitimate practice.

Lakesin's (1973) method of efficient use of one's time begins with first knowing what is needed or wanted and then using that knowledge to rank items in order of importance for their execution. To assist in the completion of those items, you should set goals that will satisfy those needs or wants, and in addition to each goal, rank the subsequent steps that you will need to accomplish in order to meet the goals. At this point you would have developed a list of action steps (goals + ordered list of corresponding steps for reaching the goals) that should allow you to establish a timeframe for completing each action step and identify how you will use your resources to accomplish the most important of your activities. Lakein (1973) also has some specific recommendations on how to set up a workspace and how to select an appropriate project management technique. Interestingly, Macan et al. (1990) created a measure of time management, which identified three primary components, which correspond to the structure developed in Lakein's framework: (1) setting goals and objectives; (2) utilising time management techniques (e.g., lists); and (3) a preference for structuring one's work. The first three steps in the current time management process model have been specifically designed to increase the frequency of performing each of the three components. The vast majority of the minimal amount of research conducted in this field has focused primarily on the effectiveness of different types of time management training (i.e. manuals, individual instruction). The results indicate that training may have an impact on how much time is spent on certain tasks that the participants had previously deemed to be highly important, such finishing projects and reading books (Hall & Hursch, 1982; A. C. King, Winett, & Lovett, 1986). A study by Hall and Hursch investigated how time management training can improve job satisfaction.

The study by Hall and Hursch (1982) involves four members of a university who struggled to complete their work-related tasks. These four individuals read a time management book and subsequently had the opportunity to work closely with a consultant multiple times over the period of one month. As a result of the training they received in time management, these employees believed they could devote more time toward performing their most important work responsibilities. They also perceived that their jobs were more enjoyable and productive. This demonstrates that people can learn how to manage their time efficiently and effectively apply their knowledge and skill toward improving their work experience. The studies referenced in this article suggest that there is a positive correlation between training employees in time management and improved work performance. However, none of the studies documented whether participants actually applied the specific time management techniques taught (e.g., Lakein and Taylor, 1973 & Mackenzie, 1986). In addition, the majority of the studies referenced contain several limitations with regards to how they were performed. Several contain a limited number of subjects (Hall and Hursch, 1982), only analyze specific sub-groups (Host, King et al., 1986), and lack a control group (Hall and Hursch, Hanel et al., 1982). These limitations are important to keep in mind when attempting to determine whether or not there is a statistically significant relationship between time management training and enhancing employee performance. Although there are a number of limitations associated with previously published studies, the research outlined in this article includes a more rigorous methodology for evaluating the effectiveness of time management training programs.

Core Components of Effective Time Management

The literature highlights several key components for effective time management:

- **Goal Setting:** Defining clear, achievable goals provides direction and focus for one's time (Crutsinger, 1994).
- **Prioritization:** Distinguishing between important and urgent tasks allows individuals to focus on those with the highest impact (McKay et al., 1996).
- **Time Estimation:** Accurately estimating the time required for tasks helps with realistic scheduling and avoids procrastination (Dewhurst et al., 1998).
- **Scheduling:** Creating a structured plan for tasks ensures dedicated time for each activity (McCrary, 2010).

- ▪ **Eliminating Distractions:** Minimizing interruptions and distractions allows for focused work on prioritized tasks (Mark & Gudith, 2008).
- ▪ **Self-Awareness:** Understanding personal work styles and energy levels helps individuals optimize their scheduling for peak productivity (Ellis & Knauff, 2000).

The Evolving Landscape of Time Management

While core principles remain relevant, the field of time management is constantly evolving. Researchers are exploring the impact of technology on time management practices. There's a growing focus on tools and applications that can support effective scheduling and task management (Mark et al., 2008). For example, time management apps can help with setting reminders, tracking progress, and prioritizing tasks. Additionally, the concept of time management is being applied beyond the workplace. Studies are examining its role in personal development and achieving life goals (Magaletta & Rees, 2018). Time management skills can be beneficial for students, individuals pursuing hobbies, or anyone juggling various commitments.

So, the current study was planned to develop a tool that can measure the level of time management.

Methodology

The present study consisted of following steps.

The whole process was consisted of four distinct steps. Firstly, items were developed using a deductive approach. Secondly, an expert evaluation was conducted. In the third step, pilot study was conducted to assess the items appropriateness. Lastly, the data collection took place for exploratory factor analysis and confirmatory factor analysis.

Generation of Item Pool: Generation of an item pool is typically the initial stage of scale development. Item pool was generated through deductive approach. Deductive reasoning works from the more general to the more specific, A deductive approach focuses on using model/theory already formed conceptualization of construct to generate items within its domain. Theoretical framework proposed by Lakein (1973) and Macan et al. (1990) was implemented

Content Validity through Expert Evaluation: To determine the content validity, the experts review was taken on items. A total of 5 experts were chosen for evaluation. They were requested to assess items based on their clarity, relevance, and comprehension about the time management. A 3-point Likert scale was used, with scores suggesting the item's a necessity (1: not necessary, 2: useful, 3: essential). The experts also offered feedback on any items that may be unclear or inappropriate. The items were changed, added, or removed based on the evaluation. The response format of items was also finalized.

Pilot Study: A sample of 50 individuals participated in the pilot study. The pilot study seeks to evaluate how well they understand and comprehend the initial list of items. It clarified any ambiguity in the understanding of instructions for test taking and statements of items.

Exploratory Factor Analysis (EFA): The EFA was performed on the sample of 340 university students with the age range of 19 to 25 years. Written consent was taken from participants. The main objective and verbal instructions were given to the participants for completing the questionnaire. A demographic form and an initial list of items was used in the assessment process.

Confirmatory Factor Analysis (CFA): After Exploratory Factor Analysis (EFA), CFA was conducted on same sample.

Ethical Consideration

All ethical issues were followed by American Psychological Association (APA) regarding research and publication. Informed consent, analysis of the risk/ benefit ratio, and confidentiality would be maintained by

the researcher. The participants were allowed to reserve the right to withdraw from participation during any time of the research.

Results

Data were evaluated through Statistical Package for Social Sciences (SPSS-24).

Table 1

Measuring Sampling Adequacy (KMO)

	Bartlett's Test of Sphericity			
	KMO	**Sig.**	**Chi Square**	**Df**
Time Management Scale for Adults	.815	.000	8422.32	325

P < .001

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .815, which is as per the recommended threshold of .80, indicating that the sample size was sufficient for factor extraction. Additionally, Bartlett's Test of Sphericity was statistically significant (p < .001), signifying that the correlations between items were sufficiently large to perform a meaningful factor analysis. EFA resulted in five factors and total variance explained for the extracted components was 71.353. one factor was removed as it has only one item.

Table 2

Rotated Component Matrix for Time Management Scale Items (N=340)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
TMS27	.838				
TMS5	.798				
TMS15	.781				
TMS14	.767				
TMS3	.761				
TMS4	.739				
TMS6	.670				
TMS11	.666				
TMS9	.654				
TMS28		.795			
TMS29		.791			
TMS26		.781			
TMS25		.734			
TMS17		.614			
TMS24		-.660			
TMS2			.856		
TMS1			.716		
TMS12			-.615		
TMS20				.772	
TMS8				.713	
TMS21				.538	
TMS23					.716

Table 2

Model Fit Summary of Confirmatory Factor Analysis (N=330)

P Value	CMIN/DF	GFI	CFI	RMSEA	TLI	AGFI
0.000	86.94	.951	.951	.095	.916	.793

Note: CFA=Confirmatory factor analysis

Multiple fit indices were utilized to assess the model's adequacy. The results indicated an acceptable to good fit for the data. The indices supported the model, with GFI and CFI both reaching .951, exceeding the recommended .90 threshold for a good fit. The TLI was .916 and the AGFI was .896, both indicating acceptable model parsimony. Finally, the RMSEA was .095, which is within the acceptable limit for a mediocre to good model fit.

Figure 1

Confirmatory Factor Analysis Result in 14 item Time Management Scale for Adults
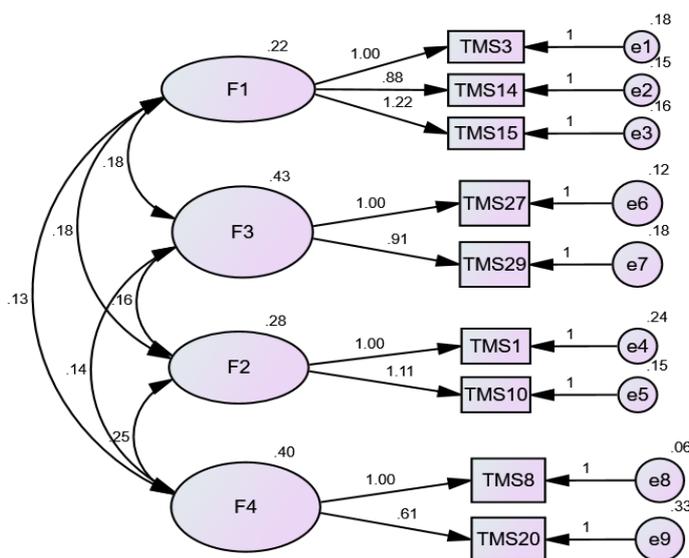
Reliability of the scale

The Cronbach alpha reliability was .85 while split half reliability was .8 and .7 respective for first and second half.

Discussion

Management Scale (TMS) for adults, using university student populations, has received empirical evidence to support accuracy. Evidence from the present study supports methodological adequacy of the measurement. Initial phases of analyses supported the ability to conduct factor extraction based upon KMO values (Kaiser, Meyer, and Olkin measure) for the 340 study participants. This sample size reached a KMO level of .80, indicating that this sample was more than sufficient to conduct factor analyses (i.e., the Kaiser-Meyer-Olkin KMO level was considered 'acceptable'). These preliminary results also were supported by the statistically significant p < 001 for Bartlet's Test of Sphericity, further indicating that factor analysis could be conducted on the study's item correlations. Aeon and Aguinis (2017) indicated that time management was a multi-dimensional construct that needed to be measured with a clear and related item base. A confirmatory factor analysis (CFA) was conducted to validate the TMS model through statistical analysis. The Confirmatory Factor Analysis (CFA) served as the cornerstone of the validation process. The model fit indices demonstrated that the four-factor model comprising Goal Setting, Prioritization, Time Estimation, and Planning offered an acceptable to good fit for the data. Specifically, the Comparative Fit Index (CFI) and Goodness of Fit Index

(GFI) both reached .951. According to Hu and Bentler (1999), values exceeding .95 indicate a superior fit between the theoretical model and the observed data. While the Chi-square was significant (p < .001), this is often attributed to the sensitivity of the metric in samples exceeding 200 participants (Jöreskog & Sörbom, 1993). The inclusion of factors such as "Goal Setting" and "Prioritization" echoes the theoretical framework proposed by Lakein (1973) and Macan et al. (1990). The high factor loadings observed in the current study suggest that these behaviors are indeed central to how adults manage their time. Furthermore, the RMSEA of .095, while on the higher end of the acceptable range, remains consistent with findings in early-stage scale development for complex behavioral constructs (Kibebsii & Chufi, 2022).

Conclusion

In conclusion, the Time Management Scale for Adults demonstrates strong statistical base. By providing a valid measure of short-range and long-range planning, this tool can assist educators and psychologists in identifying students who may be at risk of academic underperformance due to poor time-management habits.

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