Assessing and Monitoring School Wellbeing through an Automated Scoring System: Schoolday Wellbeing Model

Xin Tang, Ph.D.^{1,2}, Katja Upadyaya, Ph.D.¹, Hiroyuki Toyama, Ph.D.¹, Mika Kasanen, Ms.³, Katariina

Salmela-Aro, Ph.D.¹

¹University of Helsinki, Finland, <u>xin.tang@helsinki.fi</u>

²School of Psychology, Central China Normal University, China ³School Day Oy, Finland

INTRODUCTION

The dynamic nature of wellbeing has been largely acknowledged; however, wellbeing is typically measured as a

stable attribute using a once-per-year survey. This research aims to introduce a real-time wellbeing assessment- Schoolday Wellbeing model with the help of smart devices and an automated scoring system. The psychometric test results of the model are also reported. The role of social-emotional skills in wellbeing are examined to know which skills are effective to promote students' wellbeing.

BACKGROUND

Students' wellbeing is critical as it marks their positive development in school life and ensures their growth in the future. The assessment of wellbeing has often been static and lagged for the diagnostic/intervention purpose. In this research, we aim to introduce an automated scoring wellbeing system, Schoolday Wellbeing Model, that is featured as dynamic and real-time. During the COVID-19 pandemic, the call for such a system is imperatively needed as students' wellbeing has been largely dampened. The Schoolday model can collect wellbeing data at low cognitive cost, report wellbeing lively at multi-layer (e.g., individual-, class-, school-), and give immediate feedback. The model is constructed on the basis of the School Well-being Model (Konu et al., 2002; Konu & Rimpelä, 2002), School Demand-Resource Model (Salmela-Aro & Upadyaya, 2014), and OECD Social-Emotional Skill Model (OECD, 2019). In total, the model included four broad domains and 18 subdomains: social-emotional skills (i.e., task performance skills, emotional skills, collaboration skills, open-mindedness, and social skills), learning (i.e., self-studying, study support, learning environment, learning material), social relationships (i.e., communication with teachers/peers, communication outside school, student services), and wellbeing (i.e., physical health, healthy diet, emotions, psychological wellbeing, academic wellbeing).

RELEVANT THEORIES

School Well-being Model and School Demand-Resource Model

School wellbeing model (Konu et al., 2002; Konu & Rimpelä, 2002) defined four broad indices to represent wellbeing and its supportive environment: school conditions, social relationships, means for self-fulfilment, and health status. School conditions include physical environment, school organization, and school services. Social relationships cover school climate, relationships with teachers and peers, bullying experiences. Means for self-fulfilment includes autonomy supports and school engagement. Health status contains the evaluation of physical health condition.

School Demand-Resource model (Salmela-Aro & Upadyaya, 2014) proposed that wellbeing are the products of demand factors and resource factors. Demands are factors that cause

exhaustion and burnout, such as schoolwork loads. Resources are factors that promote personal development, such as self-efficacy.

OECD Social-Emotional Skill Model

In order to understand the key factors that enhance wellbeing, social-emotional skills are included in this research. OECD social-emotional skill model was adopted (OECD, 2019). The OECD (2015) defines social-emotional skills as: "individual capacities that (a) are manifested in consistent patterns of thoughts, feelings, and behaviors, (b) can be developed through formal and informal learning experiences, and (c) influence important socioeconomic outcomes throughout individual's life" The model proposed five broad skills: task performance, emotional regulation, collaboration, open-mindedness, and engaging with others.

YOUR RESEARCH METHODS AND WORK

This section needs to include the following subsections of your study.

Basic Design Mechanism/Framework Involved in This Study

The present research aims to report the psychometric properties of the Schoolday wellbeing model by using the first stage data (N of students = 2551) that we have collected during March-May 2020 around the globe. We then further aim to examine the predictive role of social-emotional skills in wellbeing.

Techniques/Methods Involved in This Study

The current research involves reliability and structure validity test. Cronbach's alpha was used to know the scale reliabilities. Confirmatory Factor Analyses (CFA) were used to understand the structure validity of the model. Model fits were examined using the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA) and the Tucker-Lewis Index (TLI). The TLI and CFI vary along a 0-to-1 continuum, and values greater than .90 and .95 typically reflect acceptable and excellent fits to the data respectively. RMSEA values of less than .05 and .08 reflect a close fit and a minimally acceptable fit to the data respectively. Linear mixed model was used to understand the effectiveness of social emotional skills on wellbeing.

Experiments/Sample Applications/Measurements/Analysis and Conclusions

Through the analyses, we found that the model's all sub-domain has good reliability (Cronbach's alpha = .72 - .85, except one alpha = .69 for academic wellbeing) and structural validity (model fits such as TLI, CFI, and RMSEA are adequate). Our further analyses with linear mixed models showed that task performance skills (e.g., self-control, persistence) and emotion control skills (e.g., stress resistance, emotional control) were the most consistent skills to promote psychological wellbeing, academic wellbeing, and health-related outcomes. Those findings were consistent across the globe.



Fig. 1 Schoolday Wellbeing Model.

REAL WORLD APPLICATIONS

The model has been tested and used with the school students (age 10-18) from the globe. Each student will receive one or two randomized notifications per day to answer a short survey. The survey contains three to five questions that is automatized by the underlying algorithm. The answers are anonymized and are stored in the secure server. The recorded answers will be automatically reported in the system. The system can be reached by class teacher and school principals. They all can see the wellbeing status timely on the basis of answers. Class teachers can see the class-level wellbeing status (see Figure 2), while school principals can see the school-level wellbeing status (see Figure 3).

Now the model is expanding to the global market to cover the majority of the population in the school. A reasonable cautionary is the adaptation of the model to some small population country or cultures. The meaning of the measurement items may different for those people, thus the ending results may be interpreted differently. Also, the response style by the respondents may also influence the validity of the results. If someone is more likely to choose an extreme point on the scale than others, then their results are compared in a biased way.







Fig. 3 Principal view of wellbeing indicators.

FUTUER

In the future, the model is planning to measure the wellbeing of university students and of school teachers. New questions will be designed to fit the situation of the university and of the school workplaces. New data will be collected to test the model with new sets of population. That is, the psychometric properties of Schoolday Wellbeing Model for the university students and for the school teachers will be validated again. Moreover, the role of social emotional skills for those population's wellbeing are to be examined as well. Moreover, future system may include a function that could correct the potential biased results due to the response style.

SUMMARY

In sum, our findings suggested that the Schoolday model is a valid skill, learning, and wellbeing assessment model for school students. For students who are experiencing less wellbeing, it is possible to help them by building task performance skills and emotional control skills. Moreover, the model is run with the help of an Artificial Intelligencebased system. Through continuous data collecting, scoring and reporting, the school administrators can recognize the change of wellbeing and identify the problems if there is a decline in wellbeing. The system will also inform a tailored intervention suggestion to take prompt action. This thus can largely improve our efficiency to provide help for the wellbeing.

ACKNOWLDEGEMENTS

The study has been supported by the Academy of Finland Grants 308351 and 1320371, which are awarded to Katariina Salmela-Aro. The study has been supported by Business Finland, AI in Learning project.

REFERENCES

Konu, A., Lintonen, T., & Rimpela, M. (2002). Factor structure of the School Well-being Model. Health Education Research, 17(6), 732–742. Well-being https://doi.org/10.1093/her/17.6.732

Konu, A., & Rimpela, M. (2002). Well-being in schools: a conceptual model. Health Promotion Inter https://doi.org/10.1093/heapro/17.1.79 Health Promotion International, 17(1),

OECD. (2015). Skills for Social Progress: The Power of Social and Emotional Skills. OECD Publishing. https://doi.org/10.1787/9789264226159-en

OECD. (2019). Assessing students' social and emotional skills through triangulation of assessment methods. https://doi.org/10.1787/717ad7f2-en

Salmela-Aro, K., & Upadyaya, K. (2014). School burnout and engagement in the context of demands-resources model. British Journal of Educational Psychology, 84(1), 137-151. https://doi.org/10.1111/bjep.12018



Xin Tang is an adjunct research professor at the School of Psychology, Central China Normal University, China and a Post-doc researcher at the Faculty of Educational Sciences, University of Helsinki, Finland. His research intends to uncover how students are motivated to learn, engaged in the school, grown well in school life, and how the school environment and

teaching practices can help them to reach those. His works appear in the top-tier journals such as PNAS, Journal of Youth and Adolescence, Teaching and Teacher Education.