

Chapter 2

Rasch Model: Status Quo and Prospect in China

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Abstract This paper presents an overview regarding the use of Rasch model for research currently across China, listing some significant Rasch-based research work being done or to be done ever since Pacific-Rim Objective Measurement Symposium 2012 held in China. In a word, Rasch-based research work is increasing in China. The status quo is optimistic and prospect tantalizing.

Keywords Rasch model · Translation · PROMS · Conference · Workshop

2.1 Rasch Model: Status Quo in China

Ever since Pacific-Rim Objective Measurement Symposium (PROMS) (Zhang and Yang 2012) was conducted in Jiaxing, China, with the influence, efforts have been taken to undertake the Rasch-based research work in three aspects as follows: research project, translation work, and workshop and conference.

Invited address to the 2014 Symposium of the Pacific Rim Objective Measurement Society: Guangzhou, China.

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Q. Zhang and H. Yang (eds.), *Pacific Rim Objective Measurement Symposium (PROMS) 2014 Conference Proceedings*,
DOI 10.1007/978-3-662-47490-7_2

2.1.1 A Rasch-Based Equating Project with Educational Assessment Australia

This is a joint research work being conducted by both Institute of Language Testing Jiaxing University and Educational Assessment Australia (EAA).¹ The relevant data have been successfully collected, and the report with detailed analysis via UMM and Gitest is to be submitted for presentation at PROMS 2015 in Fukowa, Japan. It is believed that such an equating project would be beneficial for Chinese students who are preparing for their national entrance examination from 2016 onward.

2.1.2 A Rasch-Based Project for Comparison Between College English Test and General English Proficiency Test

Besides the joint project with EAA, a particular Rasch-based project² was recently conducted ad hoc for comparison of English listening and reading comprehension between two important English language tests, i.e., General English Proficiency Test (GEPT) in Taiwan and College English Test (CET) in China Mainland (Zhang and Yang 2014; Zhang et al. 2014; Yang and Miao 2014).

2.1.2.1 Test Descriptions

GEPT in Taiwan is a test of English proficiency with five levels currently being administered: elementary, intermediate, high-intermediate, advanced, and quality, of which the high-intermediate level is administered ad hoc to university students of non-English majors.³

CET Band 4 is a test of English proficiency for educational purpose designed by Shanghai Jiaotong University according to the requirements of CET and administered to sophomore students of non-English majors only. CET has been administered ever since 1987 across China Mainland and even beyond. The count of CET test takers remains number one in today's world.⁴

¹This project is financially supported by EAA and was conducted in China in 2013. The details will be jointly presented at the forthcoming PROMS2015, Fukuoka, Japan.

²For details, please refer to Chapters 9–10 of the book.

³For more details, please visit <http://www.gept.org.tw/>.

⁴For more details, please visit <http://www.cet.edu.cn/>.

2.1.2.2 Research Purpose

The motivation to compare these two tests remains for ages. Online search has revealed that so far no significant researches were ever conducted in this regard. And PROMS 2013 held in Kaohsiung sparked the action and made such a research feasible. Also, the time is mature to do such a comparison with focus on both test takers' ability and test item's difficulty in terms of listening and reading comprehension in the Chinese context. Finally, Rasch model turns out to be the most appropriate approach to fulfill the task.

2.1.2.3 Significance and Limitations

The research project, while focusing on the comparison of GEPT and CET, presents the research method via Rasch supported with real data analyses and thus can be concluded in at least two points as follows.

At the first place, the present study is the pioneer one ever conducted in language testing field across Taiwan Strait. Next, probably the most significant parts of the present research are listed as follows: (1) to show to our teachers of English the importance of item analysis and test scoring with the help of Rasch (2) to demonstrate how item analysis and test scoring are actually conducted using GiTest, and (3) to understand the ideas regarding Rasch Model with detailed interpretation. However, two corresponding limitations exist: small sample size and further justification needed to administer the same test items to the students of homogeneous background in Taiwan in the same manner.

2.2 Translation Work

With joint efforts, Rasch work translation is going on well across China Mainland, Hong Kong Macau, and Taiwan. The focus is on Journal of Applied Measurement (JAM) and monograph on Rasch.

2.2.1 JAM Book of Abstract Translation

Led by Profs. Magdalena Mo Ching MOK and Zhang Quan, the series translation of books is going fine. Totally, 7 volumes will be published. So far, Volume II, Constructing Variables, Book of abstract translation of JAM from English into Chinese has been completed and published. Volume I is yet to be published to meet the readers soon. Volume II contains 205 abstracts from JAM germane to Rasch-based research work translated from English to both simple and classic Chinese by 45 highly competent translators who are working in 13 different

organizations, universities, or institutes located, respectively, in China Mainland, Hong Kong, Macau, and Taiwan. Each of these abstracts deals with Rasch measures in their research field, covering a variety of issues ranging from education, psychology, management, testing to medicine, and serving in particular as good resources for researchers and students of non-English majors in China Mainland to be able to conduct their own Rasch model analyses as well as understand and critique published Rasch-based research.

2.2.2 Monograph Translation

So far the translation from English into Chinese of the monograph⁵ by Prof. Trevor Bond has been completed and is to be published in 2016. It took approximately 3 years. The book contains all the chapters germane to Rasch theory and ideas by eight highly competent/Rasch translators who are working in five different organizations, universities, or institutes located, respectively, in China Mainland and Hong Kong. The translation serves in particular as good resources for researchers and students of non-English majors in China Mainland to be able to learn and self-teach Rasch so as to conduct their own Rasch-based analyses as well as understand and critique published Rasch-based research. Although highly theoretic, the book can be used as a text book for postgraduate students of applied linguistics in China. To quote a few words from the preface written by John “Mike” Linacre to illustrate the point: “The first edition of this remarkable work arrived stealthily. Those of us in the know were aware that it was to be released at the 2001 AERA Annual Meeting in Seattle. When the Exhibitor area opened, I headed for the Lawrence Erlbaum Associates booth and looked for the book. I purchased the very first copy. By the end of the AERA Meeting, “Bond & Fox” had sold out and was on its way to becoming an Erlbaum best seller. And deservedly so. Rigorous measurement has been essential to the advancement of civilization since Babylonian times, and to the advancement of physical science since the Renaissance.”

2.3 Workshops and Conferences

Apart from the translation work, more time, funding, and energy are also devoted to hosting international conferences such as PROMS 2012 in Jiaxing, PROMS 2013 in Kaohsiung, and PROMS 2014 in Guangzhou. Each time, experts of Rasch are invited to run pre-conference workshops to offer the practice of Rasch measurement to young teachers, researchers, and students coming from Pacific-rim regions and

⁵Trevor Bond and Christine M. Fox. (2001) Applying the Rasch Model: Fundamental Measurement in the Human Sciences Paperback ISBN-13: 978-0805842524 ISBN-10: 0805842527.

countries and beyond. In what follows is listed a brief introduction to each pre-conference and workshops run by each conference.

1. Pre-conference workshop and PROMS 2012, Jiaxing
 PROMS 2012 (Zhang and Yang [2012](#)) was held in Jiaxing University, Zhejiang Province, China, from August 6–9, 2012, with four pre-conference workshops run by:
 - 1.1. Professor Robert F. Cavanagh (August 5, 2012) who focuses on Rasch Model for beginners. The workshop attracts more Chinese participants and Rasch beginners from Pacific-rim regions and countries. And the interpretation was provided in Mandarin Chinese. This is the first time that PROMS came into China Mainland ever since it was first held in Malaysia in 2005.
 - 1.2. Professor Trevor Bond (August 4–5, 2012) who presented with interpretation support in Mandarin Chinese to let more early Mainland researchers to fully understand the idea of Rasch Model used in measurement. Young researchers recommended by the workshop runner also gave some strand keynote. WINSTEPS was demonstrated with examples to illustrate the ideas.
 - 1.3. James Sick, EdD (August 5, 2012) from International Christian University, Tokyo, Japan, who gave introduction to many facets of Rasch measurement using FACETS. At the workshop, participants took their personal laptops. A time-limited edition of FACETS and example data for use were provided by Mike Linacre. Interpretation was provided in Mandarin Chinese for better understanding of non-English major participants.
 - 1.4. Dr. Eric Wu (August 5, 2012) from UCLA who gave a full introduction to EQS. At the workshop, participants took their personal laptops. B version of EQS and example data for use were demonstrated. His workshop was run in both English and Mandarin Chinese.
2. PROMS 2013 was held in Kaohsiung, National Sun Yat-sen University, Taiwan, from August 3–5, 2013, with three pre-conference workshops run by:
 - 2.1 Dr. Mark Ronald Wilson (August 2, 2013) from University of California, Berkeley, USA, whose topic is “The BEAR Assessment, Large Scale Assessment, and Explanatory Measurement.” The workshop is divided into three parts. The first part introduces the BEAR Assessment System (BAS) designed to build upon methodological and conceptual advances in assessment. The second part explores implications of the BAS for large-scale assessment. The argument here lies in that the current emphasis on testing in education has led to a, to use Mark’s word, “squeeze” that teachers and their students experience between the need to cover many standards and the educator’s wish to value meaningful instruction and assessment. In the third part, the presenter describes a role for the BAS in explanatory measurement, emphasizing how item response models can be coordinated and broadened to stress their explanatory uses beyond their standards descriptive uses with the ideas exemplified in the context of a reading comprehension test.

- 2.2 Professor Jack Stenner (August 1, 2013) who ran LEXILE Workshop with research on and application of the LEXILE framework for reading abstract. Professor Stenner provided extensive, interactive training on how the LEXILE framework for reading was built. Participants attended the workshop in group activities with hands-on learning experiences that can impact their day-to-day assessment and psychometric practice.
- 2.3 Professor Margaret Wu (August 1–2, 2013) who gave detailed introduction to and demonstration of Using Test Analysis Modules (TAM) software for IRT analysis. TAM fits the Rasch model and 2PL models that can estimate unidimensional and multidimensional models with latent regression and facet terms. Both joint maximum likelihood and marginal maximum likelihood estimations can be used. Detailed instructions regarding downloading TAM were provided before the workshop.
3. PROMS 2014 (Zhang and Yang 2014) was held in Panyu, Guangzhou, China Mainland, from August 5–7, 2014, with four pre-conference workshops run by:
 - 3.1 Professor Bond, Trevor and Dr. Yan, Zi (August 2–3, 2014) who gave a full introduction to Rasch Measurement Using WINSTEPS. Previous knowledge of Rasch model is not required. The 2-day workshop covered an introduction to Rasch model, the background knowledge, and the basic ideas regarding Rasch measurement including computing ability estimates and item statistics, plotting item characteristic curves, estimating population characteristics, and so on. Questions and answers and follow-up discussions were conducted in English with Chinese interpretation.
 - 3.2 Professor Margaret Wu (August 2–3, 2014) who gave similar yet more detailed introduction to and demonstration of Using TAM software for IRT analysis. TAM is an IRT software program written in R. It is free for download. TAM can fit one-parameter, two-parameter, and multidimensional IRT models and can be used for dichotomous and partial credit item responses. The workshop was run in both English and Chinese to ensure all the participants of non-English majors got the ideas.
 - 3.3 Professor Stenner, Jackson (August 2, 2014), chairman, CEO, and co-founder of MetaMetrics Inc, president of the Board of Directors of Institute of Objective Measurement, a board member for the National Institute for statistical sciences and a past board member for Duke Children's Hospital and the North Carolina Electronics and Information technologies Association, USA who gave introduction to LEXILES and developing construct models.
 - 3.4. Professor Engelhard, George (August 3, 2014) who gave a full introduction to Invariant Measurement with Raters and Rating Scales. The use of rating scales by raters is a popular approach for collecting human judgments in numerous situations. This workshop utilizes the principles of invariant measurement (Engelhard 2013) combined with lens models from cognitive psychology to examine judgmental processes that arise in rater-mediated assessments, with focuses on guiding principles that can be used for the

creation, evaluation, and maintenance of invariant assessment systems based on human judgments.

The purpose of this workshop is to provide an introduction to the concept of invariant measurement for rater-mediated assessments, such as performance assessments. Rasch models provide an approach for creating item-invariant person measurement and person-invariant item calibration. This workshop extends these ideas to measurement situations that require raters to make judgments regarding performance assessments and also provides an introduction to the Many Facet Model and its use in the development of psychometrically sound performance assessments. Illustrated are examples based on Advanced Placement English Literature and Composition assessments as well as other large-scale writing assessments. The FACETS computer program designed by Linacre in 2007 is used throughout the workshop to illustrate the principles of invariant measurement with raters and rating scales.

4. Furthermore, PROMS 2012 and 2014 Conference Proceeding (Zhang and Yang 2012, 2014) published by the Springer are listed by Conference Proceeding Citation Index (CPCI). In this way, Rasch measurement is further disseminated across China, in the Pacific-rim and in the world as well. The book performance report published by the Springer shows the idea.⁶

Here subsequently is provided an overview of how PROMS 2012 Proceeding has been performing on the market. Because e-Books have become well established among academic and corporate scientists, the paper-based report concentrates on the electronic version of your publication. Our PROMS Proceeding e-Book is available from Springer Link, which provides readers with access to millions of scientific documents from journals, books, series, protocols, and reference works. All types of publications are interconnected and are fully indexed and searchable to chapter level. As a result PROMS 2012 Proceeding e-Book appears as high up on search engine results' lists as possible and gains higher visibility.

ISBN 978-3-642-37592-7(e-book) ISBN 978-3-642-37591-0 (print book) Book Performance Report springer.com.

2.4 Rasch Model: Prospect in China

It goes without saying that the increasing Rasch-based research work in China is by no means confined within the outline mentioned earlier. More examples can be observed: in Hong Kong, apart from the PROMS pre-conference workshops, workshop of the similar nature was also arranged on January 15–16, 2015. “A General Class of Latent Structure Models Useful for Applications in Cognitive

⁶<http://www.springer.com/alert/urltracking.do?id=L4b93afaMf771e4Sb0b3f0a>.

Diagnosis, Scaling, and Clustering” was organized by Assessment Research Centre, The Hong Kong Institute of Education. In Jiaxing, Rasch Model Online Forum has been launched and in Macau, the new PhD program, City University of Macau has started to get involved in application of Rasch for CAT research, a new PhD program approved by the Ministry of Education, China. In a word, the status quo is optimistic and the prospect is tantalizing. For all Raschers, rigorous measurement has been essential to the advancement of civilization since Babylonian times and to the advancement of physical science since the Renaissance and will surely keep with the rhythm of computer and Internet era.

Acknowledgment We would like to thank the anonymous reviewers and our foreign counterparts for suggestions that greatly helped improve the paper.

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Pacific Rim Objective Measurement Symposium (PROMS)

2014 Conference Proceedings

Rasch and the Future

Zhang, Q.; Yang, H. (Eds.)

2015, XXI, 390 p. 61 illus., 39 illus. in color., Hardcover

ISBN: 978-3-662-47489-1