Validating Technological Innovation

David Coniam • Peter Falvey

Validating Technological Innovation

The Introduction and Implementation
of Onscreen Marking in Hong Kong

Springer

David Coniam
Department of Curriculum and Instruction
The Education University of Hong Kong
Tai Po, Hong Kong

Peter Falvey
Department of Curriculum and Instruction
The Education University of Hong Kong
Tai Po, Hong Kong

ISBN 978-981-10-0432-2 ISBN 978-981-10-0434-6 (eBook)
DOI 10.1007/978-981-10-0434-6

Library of Congress Control Number: 2016936563

© Springer Science+Business Media Singapore 2016

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer Science+Business Media Singapore Pte Ltd.

Foreword

Validating Technological Innovation: The Introduction and Implementation of Onscreen Marking in Hong Kong is not only a coherent account of a series of validation studies linked to the implementation of onscreen marking (OSM) in Hong Kong, it is a book representing a 35-year research collaboration of the two authors who have in-depth knowledge about the context of the research. Mostly importantly, it is a book about the future of the field. It is challenging to predict the future in the current world of ours with many uncertainties, but I have no doubt that validation research of onscreen marking will increase, and this book will be read by many researchers for years to come.

As the new millennium was getting underway, in January 2000, Lyle Bachman's article, entitled 'Modern language testing at the turn of the century: assuring that what we count counts', appeared in *Language Testing* (Volume 17). The article is a 40-plus-page comprehensive review of language testing in the 1980s and 1990s, drawing on more than 200 published works. The personal, retrospective paper focuses on a wide range of areas that developed mainly in the 1990s, including: '(a) research methodology; (b) practical advances; (c) factors that affect performance on language tests; (d) authentic, or performance, assessments; and (e) concerns with the ethics of language testing and professionalising the field' (Bachman 2000, p.4).

Under (b), Bachman lists computer-based assessment as one of practical advances in the field of language testing pointing to the increasing use of computer technology in the development and delivery of language tests. He stated that 'On the practical side, advances in the technology of test design and development, along with the availability and use of ever more sophisticated computer- and web-based applications for test administration, scoring and analysis, have resulted in a greater range of test formats and assessment procedures than has ever been available'. In this, Bachman cautions the field that 'the challenge in applying such technologies to language assessment will be to recognise not only the potential benefits but also the limitations of these technologies, and not let the psychometric and technological tails wag the applied linguistics dog' (p. 9). In discussing the future and what lies ahead, Bachman states that 'the abstract technical debate about dimensionality and the appropriateness of different IRT models has, I believe, been replaced with a

much more pragmatic focus on practical applications, particularly with respect to performance assessments that involve raters and computer-based tests' (p. 22). Bachman did not specifically discuss onscreen marking, but the above statements clearly direct us to the challenges we are facing in the use of computer-assisted assessment over traditional paper methods. In this sense, this book presenting a coherent series of research studies into onscreen assessment of continuous writing and its impact upon markers' judgements is, therefore, both timely and important.

As the two authors point out, onscreen marking (the marking of examination scripts on screen instead of on paper) is being used much more frequently as technology develops. Over the past 10 years, there has been a worldwide move towards OSM. Indeed, OSM can offer many benefits over traditional paper methods. However, in transferring from one medium to another, it is crucial to understand the extent to which the new medium may alter the nature of traditional assessment practice and affect marking reliability through empirical evidence, evidence that is provided by this book.

This book is unique in a number of ways. First, it charts the development of the validity of OSM in the implementation of OSM across the board in Hong Kong, i.e. in *every* subject in the public school leaving examination system. The book further provides a series of validation studies over time, which began, in 2009, with the publication of Coniam (2009a), the first description of what became, by 2014/2015, a series of validation studies of OSM in the school public examinations system in Hong Kong, operated by the Hong Kong Examinations and Assessment Authority (HKEAA). In total, nine validation studies were carried out and published by David Coniam, sometimes with co-writers (Alison Sau-chu Yeung [Chap. 7], Zi Yan [Chaps. 10, 12 and 13] and Peter Falvey, the co-author of this book).

Second, the book provides a coherent picture, from a disparate series of validation research studies, backed by useful background information on Hong Kong's education and assessment history, the HKEAA and its work (Chap. 2), a pictorial representation of the OSM process taken from screenshots (Chap. 3) and an introduction to the methodological approaches and tools used in the quantitative and qualitative studies on the OSM process. Therefore, this mixture of background information and research input makes this book extremely useful for readers and other academics within other similar educational contexts. In this sense, the book also provides a useful template for authorities/jurisdictions who want to carry out thorough validation studies in preparation for the wholesale implementation of OSM.

Third, the book is a labour of love from two authors who have had a long, productive association as writers, researchers, teachers, publishers and colleagues stretching over 35 years within the Hong Kong language education context and internationally. Much of this long association started in Hong Kong where they both have an in-depth knowledge of the education and examination system and have established good working relations with the HKEAA and the Education Bureau of the Government of the Hong Kong Special Administrative Region. Such a collaborative connection between test users and test developers and educators and ministries of education is rare in other education contexts. Further, much of the long

association between the authors has a background in assessment (many books, chapters in books and article publications). David and Peter have spent 20 years on language benchmarking (with a lot of publications) and now OSM. They both have a background with examination authorities (David with the HKEAA where he was an HKEAA officer and long-time examination developer and Peter with Cambridge Assessment where he was an advisory consultant on secondment from his specialist work with the British Council). Such a unique relationship in assessment and in-depth understanding of the Hong Kong context is reflected in the coherence of this programme of research.

Validating Technological Innovation: The Introduction and Implementation of Onscreen Marking in Hong Kong not only brings the most recent work on OSM situated in a unique context of education but also makes many new and significant contributions to the field, which I believe have the potential to help test developers and test users all over the world.

Faculty of Education, Queen's University
Kingston, ON, Canada

Liyong Cheng

Reference

Bachman, L.F. (2000). Modern language testing at the turn of the century: Assuring that what we count counts. *Language Testing*, 17(1), 1–42.

Acknowledgements

We are grateful to a number of people whose efforts, scholarship and expertise made this book possible.

Christina Lee of the Hong Kong Examinations and Assessment Authority (HKEAA) provided her expertise and experience to create and write Chaps. 2 and 3. Chapter 2 ‘The Role of the Hong Kong Examinations and Assessment Authority’ introduces the reader to the background to the development and implementation of OSM in Hong Kong and describes the processes that the innovation went through. In Chap. 3, ‘Onscreen Marking System’, Christina, through the use of screen-grabs demonstrates for the reader what the markers physically see on the screen as they process and mark scripts and record their marks.

We are also grateful to Alison Sau-chu Yeung (Chap. 7) and Zi Yan (Chaps. 10, 12, and 13) for their contributions to papers that they co-wrote with the authors and for their consent to publish their papers.

As we acknowledge in the footnote to Chap. 4, we are grateful to Julie Mackay of Cambridge Assessment and Sarah Phillips of RM Results for their efforts in securing us details of Cambridge examinations marked by means of OSM. In terms of the provision of relevant research information, we are grateful to Ardeshir Geranpayeh of Cambridge Assessment for his links to relevant Cambridge-based research.

Finally, we would like to thank Professor Liying Cheng of Queens University, Kingston, Ontario, for writing a Foreword. She is an extremely busy academic, working in the field of examinations and assessment, and we are grateful to her for her efforts at a particularly busy time in her work cycle.

Contents

1	The Hong Kong Education and Assessment Systems	1
	The Education System	1
	Language Policy	2
	Kindergartens	3
	Primary Education	3
	Secondary Education	4
	Tertiary Education	4
	The Hong Kong Diploma of Secondary Education (HKDSE)	5
	Subjects Examined	6
	The HKDSE Grading System	6
	Summary	7
2	The Role of the Hong Kong Examinations and Assessment Authority	9
	The Hong Kong Examinations and Assessment Authority	9
	Background to OSM in Hong Kong	10
	Development of OSM	11
	The Onscreen Marking Process	12
	Allocation of Scripts	12
	Marking and Check-Marking Procedures	12
	Double Marking	14
	Benefits and Drawbacks of OSM	14
	Benefits	15
	Drawbacks	15
	Weighing the Pros and Cons	16
	Implementing OSM	18
	Future Developments	19
	Conclusion	19
	Appendix 1: Selected HKEAA Milestones	20

3	Onscreen Marking System	23
	Getting Started	23
	Logging into the OSM System	24
	Viewing Reference Scripts	25
	Viewing Marking Summary	27
	Marking	28
	Adding Symbols to Scripts	28
	Inserting Comments into Scripts	30
	Awarding Marks to Scripts	31
	Viewing Marking Records	32
	Viewing Marking Statistics	34
	Conclusion	35
	Appendix A	36
	The Graduating Students' Language Proficiency Assessment (GSLPA) OnScreen Rating System (ORS)	36
	History of the GSLPA	36
	The GSPLA	37
4	Review of Research into Onscreen Marking and a Description of the Methodological Approaches and Analytical Tools Used in the OSM Validation Studies	43
	Part 1: A Review of the Research Literature on OSM	43
	Part 2: Theoretical Underpinning, Methodological Approaches and Analytical Tools	48
	Theoretical Underpinning	48
	Methodological Approaches	49
	Quantitative Survey Approach	49
	Qualitative Approach Including a Grounded Theory Approach	49
	Methodological Tools	50
	Parametric Tests	50
	The T-test	51
	ANOVA (Analysis of Variance)	51
	The Pearson Product-Moment Correlation	51
	Non-parametric Tests	51
	The Chi-Squared Test	51
	Significance	52
	The Rasch Model	52
	Many-Facet Rasch Measurement (MFRM) and Data Analysis	53
	MFRM Analysis: Results and Discussion	54
	Qualitative Data Analysis	55
	Summary	55

5	The First Validation Study: Comparing OSM and PBM in English Language HKCEE (Year 11) Essays Using Classical Statistics and Rasch Measurement.	57
	Introduction.	58
	Assumptions	58
	The Research.	59
	Data.	59
	Markers and Scripts	60
	Background Details of the Markers	61
	Analysis.	62
	Results and Discussion	63
	Computer Proficiency	63
	OSM and PBM Marking Issues	63
	Test Data	65
	Writing Paper Prompts	66
	Inter-marker Reliability Correlations	67
	Marker Experience Status as a Grouping Variable	67
	Discrepancies Between the Two Forms of Rating	68
	Many-Faceted Rasch Measurement (MFRM) and Data Analysis	69
	MFRM Analysis: Results and Discussion.	69
	Conclusion	73
	Notes	75
	Appendix 1: 2007 HKCEE English Language Writing Paper, Task 2	76
	Appendix 2: Onscreen Marking Questionnaire – 2007 HKCEE English Language Writing Paper	76
6	The Second Validation Study: A Qualitative Study of the Response of Markers Towards Onscreen and Paper-Based Marking	79
	Introduction.	79
	The Study	80
	Data.	81
	Semi-structured Interviews: Standardisation of Interviewers.	81
	Results and Discussion	82
	IT Proficiency and the Ability to Cope with the Technical Demands of OSM	82
	Reading on Screen	83
	Views on the Reliability and Efficiency of Marking by OSM	84
	Re-reading of Scripts	85
	Training and Standardisation	86
	Attitudes Towards OSM Marking Centres	88
	Views on Working from Home	89
	Conclusion	90

Appendix 1: Interviewees' Profiles	91
Appendix 2: Checklist of Guideline Questions for the Semi-structured Interviews	92
7 The Third Validation Study: Markers' Perceptions of the Onscreen Marking of Liberal Studies in the Hong Kong Public Examination System	93
Introduction	94
Liberal Studies	95
Research Questions	96
The Validation Study	96
Results	97
Markers, Test Takers and Modules	97
Markers Details	98
Pre-marking Questionnaire	99
Post-Marking Questionnaire	101
Pre- and Post-Marking Comparisons	103
Conclusion	104
Appendix 1: 2009 ASL Liberal Studies: Onscreen Pre-marking Questionnaire	105
Appendix 2: 2009 ASL Liberal Studies: Onscreen Post-Marking Questionnaire	107
8 The Fourth Validation Study: A Qualitative Examination of the Attitudes of Liberal Studies (LS) Markers Towards Onscreen Marking in Hong Kong	109
Introduction	109
The Qualitative Study	110
Subjects	110
Interview Team	111
Data Analysis	111
Results	112
Computer Hardware and Software	112
Marking Centres: The Environment, Location and Booking	114
Marker Training, Support and Standardisation	115
Marking-Related Issues	116
Discussion	118
Conclusion	120
Notes	120
Appendix 1: Participant Profiles	121
9 The Fifth Validation Study: Examining Negative Attitudes Towards OSM in Hong Kong	123
Introduction	123
Impetus for the Current Study	124
Data	126
Results and Discussion	126

Scores Awarded to Test Takers	127
Marker Attitude as a Grouping Variable	127
Correlations Between 2007 HKCEE English Language Papers.	128
Marker Erraticness	129
Conclusion	131
Note.	132
10 The Sixth Validation Study: Assessing the Ease of Use in the Environment and Markers' Acceptance of Onscreen Marking in Hong Kong in Three Subject Areas: A Rasch Measurement Perspective	133
Introduction.	134
The Rasch Model	136
Background to the Study.	137
The Study	138
Research Questions.	139
Data Analysis	140
Language, Question Type, and Subject of Scripts	141
Results and Discussion	141
Ease of Use in the OSM Environment Scale	141
Acceptance of OSM Scale	144
Person Measures on the Ease of Use in the OSM Environment and Acceptance of OSM Scales	145
Comparisons of Mean Person Measures.	148
Conclusion	151
Note.	153
Appendix 1: 2012 HKALE/HKDSE: Onscreen Post-Marking Questionnaire	153
Appendix 2: Finalised Instrument.	154
11 The Seventh Validation Study: The Increasing Acceptance of Onscreen Marking: The 'iPad Effect'	157
Introduction.	158
Tablet Computers: Background and Their Uptake in the Field of Education.	159
The Study	160
Research Questions.	162
Results and Discussion	162
Markers, Test Takers and Modules	163
Owning a Tablet	164
Conclusion	167
Note.	168
2012 HKAL/HKDSE: Onscreen Pre-marking Questionnaire: Marking Assistants	169
2012 HKAL/HKDSE: Onscreen Post-Marking Questionnaire: Marking Assistants	169

12 The Eighth Validation Study: The Effects of Key Demographic Variables on Markers' Perceived Ease of Use and Acceptance of Onscreen Marking	171
Introduction	171
The Study	174
Dataset	174
Research Questions	175
Methodology	175
Instrument	175
Procedure	176
Sample	176
Results and Discussion	177
The Psychometric Properties of the Two Scales for Use with the Sample in the Current Study	177
Markers' Responses to the Ease of Use in the OSM Environment and Acceptance of OSM Scales	178
Effects of Language of Marking, Gender, Age on Markers' Reactions to OSM	179
Discussion and Conclusion	182
Notes	185
Appendix 1: Onscreen Marking Questionnaire	185
Appendix 2: Item Fit Statistics, Item Measures with Standard Errors (in parentheses), and Category Thresholds	186
Appendix 3: Marker-Item Maps	186
13 The Final Validation Study: A Comparative Picture of the Ease of Use and Acceptance of Onscreen Marking by Markers Across Subject Areas	189
Introduction	190
Research Questions	191
Methodology	191
Responses to the Likert-Type Questionnaire	192
Open-Ended Comments	194
Interviews with Key HKEAA Personnel	194
Results and Discussion	195
The Psychometric Properties of the Two Scales	195
Cross-Subject Area Comparison	195
Marker Measures on the Two Scales	196
Analysis of Written Comments	199
Interview with HKEAA Personnel	201
Conclusion	203
Notes	205
Appendix 1: HKDSE, HKALE Subject Areas Marked on Screen in 2012	205

14 Conclusion	207
Introduction	207
Chapter 1	207
Chapter 2	207
Chapter 3	208
Chapter 4	208
Chapter 5	208
Chapter 6	208
Chapter 7	209
Chapter 8	209
Chapter 9	210
Chapter 10	210
Chapter 11	211
Chapter 12	211
Chapter 13	211
Weaknesses Identified with the Implementation of OSM in the Validation Studies	212
Overall Evaluation	213
Erratum	E1
References	215
Index	225

Contributors

Liying Cheng is Professor and Head of the Assessment and Evaluation Group at the Faculty of Education, Queen's University at Kingston Ontario, Canada. Her primary research interests are the impact of large-scale testing on instruction and the relationships between assessment and instruction.

David Coniam is Chair Professor of Curriculum and Assessment and head of the Department of Curriculum and Instruction in the Faculty of Education and Human Development at The Education University of Hong Kong, where he is a teacher educator, working with teachers in Hong Kong primary and secondary schools. His main publication and research interests are in language assessment, language teaching methodology and computer-assisted language learning.

Peter Falvey is a teacher educator. A former head of department in the Faculty of Education, the University of Hong Kong; he is currently affiliated in an honorary professorial role with The Education University of Hong Kong. His main publication and research interests are in language assessment, first and second language writing methodology and text linguistics.

Christina Lee is Director of Public Examinations at the HKEAA. She leads the development and administration of the Hong Kong Diploma of Secondary Education (HKDSE) and is responsible for the implementation, review and enhancement of public examination policies and procedures. She led the onscreen marking (OSM) project and played an important role in the introduction of OSM in 2007 and its subsequent across-the-board implementation in the HKDSE.

Alison Sau-chu Yeung is Associate Professor of practice in the Department of Curriculum and Instruction in the Faculty of Education at the Chinese University of Hong Kong, where she offers courses on the subject and curriculum teaching of Chinese history, world history, liberal studies and general studies. Her research interests include history education, subject culture, teacher education, teachers' narratives and women's history.

Zi Yan is Assistant Professor and associate head of the Department of Curriculum and Instruction in the Faculty of Education and Human Development at The Education University of Hong Kong. His main publication and research interests are in educational and psychological assessment and Rasch measurement.

Common Abbreviations Used in the Book

BAFS	Business, accounting and financial studies
CMI	Chinese medium of instruction
CTT	Classical test theory
DIF	Differential item functioning
EMI	English medium of instruction
‘gaokao’	National College entrance examination
GSLPA	Graduating students’ language proficiency assessment
HKALE	Hong Kong advanced level examinations
HKCEE	Hong Kong certificate of education examination
HKDSE	Hong Kong diploma of secondary education
HKEAA	Hong Kong examination and assessment authority
HKIEd	Hong Kong Institute of Education
HKSAR	Hong Kong Special Administrative Region
ICT	Information and communication technology
IELTS	International English language testing system
LPAT	Language proficiency assessment for teachers
LS	Liberal studies
MFRM	Many-Facet Rasch measurement
OSM	Onscreen marking
PBM	Paper-based marking
TSA	Territory-wide system assessment
UEC	HKALE use of English examination

Introduction

Abstract This introductory chapter introduces the reader to our purpose in writing this book, viz. to provide a coherent account of the design and implementation of onscreen marking of examination scripts in public examinations in Hong Kong by linking a number of validation studies between 2009 and 2012. We explain why we chose to take the nine validation studies on OSM which had been previously published and bind them together into a coherent whole by surrounding them with an explanatory background to Hong Kong's educational and assessment history and by setting out relevant research in this area from around the world. A short description of each chapter is then provided.

Overview of Book Structure

The purpose of this book is to provide those involved in public examinations and other scholars interested in assessment and evaluation with a coherent account of a series of validation studies linked to the implementation of onscreen marking (OSM) in Hong Kong. Onscreen marking (the marking of examination scripts on screen instead of on paper) is being used more and more often as technology develops. This series of validation studies began, in 2009, with the publication of Coniam (2009a), the first description of what became, by 2014/2015, a series of validation studies of OSM in the school public examinations system in Hong Kong, operated by the Hong Kong Examinations and Assessment Authority (HKEAA). In all, a total of nine validation studies were carried out and published by David Coniam, sometimes with co-writers (Alison Sau-chu Yeung, Zi Yan and Peter Falvey, the co-author of this book). The co-authors and the publications in which the articles originally appeared are provided at the end of each abstract in the descriptions of the relevant chapters below.

It quickly became apparent to the authors that a number of assessment scholars were unable to access all the papers easily as a coherent whole. After discussion, the authors agreed to consolidate the validation studies in the production of a book

consisting of 14 chapters. The four opening chapters would be completely new. Chapter 1, entitled ‘The Hong Kong Education and Assessment Systems’, helps to orientate readers to the history of Hong Kong’s education system and its curricula in addition to its changing assessment curricula, particularly the wide-ranging changes that occurred after Hong Kong was handed back to China in 1997. Chapter 2, written by Christina Lee of the HKEAA provides an account of the role of the HKEAA in the process of inaugurating, developing and implementing OSM. Lee makes clear our relationship with the HKEAA, and that the research studies we conducted were conducted independently and not associated with, sponsored by or funded by the HKEAA. Chapter 3 uses screen grabs to pictorially help the reader understand the processes that markers go through when undergoing training, qualifying and live marking on OSM. Chapter 4, entitled ‘Review of Research into Onscreen Marking and a Description of the Methodological Approaches and Analytical Tools Used in the Validation Studies’, describes two things: the research literature on OSM and the methodological approaches used in the validation studies together with a description of the analytical tools used in the data analysis. The chapter also describes how the book is unique.

After the four opening chapters, the validation studies are presented in Chaps. 5, 6, 7, 8, 9, 10, 11, 12, and 13 which update, refresh and where necessary revise and re-write the original nine journal articles in such a way as to reveal the processes that occurred during the initiation and completion of the studies and to make that process coherent to the reader. The revising of the chapters makes clear the links between the chapters and the events/reactions from stakeholders that influenced the direction of subsequent studies and how they were reported in subsequent chapters, e.g. enlarging studies from one subject area to more than one subject area to, eventually, coverage of all subjects in Chap. 13 and, for example, reacting to stakeholders’ views in the study described in Chap. 9. Chapter 14 summarises what has gone before and concludes the book.

Chapters 5, 6, 7, 8, 9, 10, 11, 12, and 13: The Validation Studies

This section presents an overview of the contents of Chaps. 5, 6, 7, 8, 9, 10, 11, 12, and 13.

Chapter 5

Chapter 5 describes the first validation study. It is entitled ‘The First Study: Comparing OSM and PBM (Paper-Based Marking) in English Language HKCEE (Year 11) Essays Using Classical Statistics and Rasch Measurement’. There were four hypotheses: two related to marker attitude and two to statistics. The first was

that markers would be sufficiently competent technologically to function effectively within the new OSM medium. The second was that markers would not be negative about the OSM medium, showing no preference for either marking medium. These hypotheses investigated the crucial issues of technological competence and marker attitudes towards OSM, without which the implementation of OSM would be invalid and marker attitudes could affect the successful implementation of the innovation. Overwhelmingly negative attitudes towards OSM could have affected the validity of the innovation.

The third and most essential hypothesis was that inter-marker reliability between the two marking mediums would be comparable to inter-marker reliability achieved between markers marking on paper. The fourth, equally essential hypothesis was that the marking medium would not affect scores awarded to test takers, with test takers obtaining the same score whether their scripts were marked on screen or on paper. These two hypotheses were critical in that stakeholder confidence would be badly shaken if inter-marker reliability was not comparable and if different scores were to be awarded in paper-based marking and onscreen marking.

This study originally appeared as: Coniam, D. (2009). A comparison of onscreen and paper-based marking in the Hong Kong public examination system. *Educational Research and Evaluation*, 15(3), 243–263.

Chapter 6

Chapter 6 is entitled ‘A Qualitative Study of the Response of Markers Towards Onscreen and Paper-Based Marking’. It uses the same markers as the study in Chap. 5. It investigates the in-depth responses not only of those who had experience of OSM but of those who formerly had marked only on paper. It discusses marker attitudes towards various issues. The first topic investigates IT proficiency and the markers’ ability to cope with the technical demands of OSM. This is followed by five other issues that arose during the semi-structured interviews, some of which had not been revealed in the quantitative survey described in Chap. 5, viz. reading on screen, views on the reliability and efficiency of marking by OSM, training and standardisation, attitudes towards OSM marking centres and views on working from home.

This study originally appeared as: Falvey, P. and Coniam, D. (2010). A qualitative study of the response of markers towards onscreen and paper-based marking. *Melbourne Papers in Language Testing*, 15(1), 1–26.

Chapter 7

Chapter 7 is entitled ‘Markers’ Perceptions of the Onscreen Marking of Liberal Studies in the Hong Kong Public Examination System’. The hypotheses in this quantitatively based study relate to the attitudes of markers of liberal studies (LS) to

OSM. It moves the series on from a study of English language markers to liberal studies markers. The first hypothesis is that markers will judge themselves to be sufficiently competent technologically to function effectively within the new OSM medium. The second hypothesis is that markers will not be negative about the OSM medium and will show no preference for either marking medium. The results of the study indicated that OSM was becoming accepted into marker psyche of what marking involves.

This study first appeared as: Coniam, D. and Yeung, A. (2010). Markers' perceptions regarding the onscreen marking of Liberal Studies in the Hong Kong public examination system. *Asia Pacific Journal of Education*, 30(3), 249–271.

Chapter 8

The study reported in Chap. 8 is entitled 'A Qualitative Examination of the Attitudes of Liberal Studies Markers Towards Onscreen Marking in Hong Kong'. Similar to the qualitative study described in Chapter 6, this study is also a qualitative investigation that complements the quantitative study of liberal studies outlined in Chap. 7. It describes markers' attitudes and insights through the use of 'thick' description (Geertz 1973).

Chapter 8 reports on the detailed responses of LS markers in semi-structured interviews. The study investigates markers' perceptions of the benefits and drawbacks of the new OSM system from four perspectives: The four major areas were:

1. Computer hardware and software
2. Marking centres: environment, location and booking
3. Marker training, support and standardisation
4. Marking-related issues

A number of new findings emerged from the qualitative data. One new finding involved the use of the Internet to check the accuracy of student content and/or plagiarism – potentially an interesting issue for the HKEAA. The most frequent concluding comment was the need for more marking centres. It would appear from the results that, despite its present shortcomings, the potential of OSM as a viable system was being recognised and generally accepted.

This study on which this chapter is based first appeared as: Coniam, D. (2011). A qualitative examination of the attitudes of Liberal Studies markers towards onscreen marking. *British Journal of Educational Technology*, 42(6), 1042–1054.

Chapter 9

Chapter 9 is entitled 'Examining Negative Attitudes Towards OSM in Hong Kong'. The study extends the second research question from the study described in Chap. 5. In that study, markers completed a questionnaire detailing their attitudes towards

the onscreen and paper-based marking processes. In terms of attitudes between the two sets of markers – old and new – there were clear differences. In terms of general preference for onscreen versus paper-based marking, new markers rated OSM more positively than experienced markers. Also, in terms of a preference for marking at home or at a centre, new markers rated centre marking much more positively than did experienced markers; new markers also felt that having to travel to a special marking centre was less of an inconvenience than that endured by experienced markers. The details of the study described in Chap. 5 were presented to the HKEAA Research and Development Committee in early March 2009. The Committee accepted the report, but raised concerns about negative Hong Kong teacher marker attitudes towards the general adoption of OSM. The Committee had concerns about the attitude of these disaffected markers and wondered whether those attitudes might be reflected in the scores awarded to test takers. These concerns provided the impetus for the study described in this chapter. The stated hypothesis in Chap. 5 that ‘markers will not be negative about the OSM medium, showing no preference for either marking medium’, could be neither proved nor disproved, although the tendency was for a more negative than positive orientation.

As stated above, the study in Chap. 9 extended the second research question from the original study and investigated whether markers’ attitudes affected the OSM mark awarded. Specifically, it pursued two hypotheses:

1. That markers holding a negative attitude towards OSM would rate test takers more harshly than would markers who have a positive attitude
2. That markers holding a negative attitude towards OSM would be more erratic than more positively oriented markers

Clearly, if both hypotheses were accepted, there would be a validity issue with OSM when faced with negative markers whose marks were affected by their attitude to OSM. This chapter describes what those reactions were.

This study originally appeared as: Coniam, D. (2010). Examining negative attitudes towards onscreen marking in Hong Kong. *Education Journal*, 37(1–2), 71–87.

Chapter 10

The study described in Chap. 10 is entitled ‘Assessing the Ease of Use in the Environment and Markers’ Acceptance of Onscreen Marking in Hong Kong in Three Subject Areas: A Rasch Measurement Perspective’. The study expanded the data base of English language and liberal studies markers by including the entire set of scripts from three subject areas: liberal studies, English language and Chinese language. LS scripts comprised extended essays, while English language and Chinese language scripts comprised the sections requiring short-answer questions. In addition, there was a language factor in the study, with candidate scripts written in English or Chinese.

With this heterogeneous background – and with the overriding objective of calibrating a robust instrument for use in a future large-scale study (see Chap. 13) – there were two linked sets of hypotheses: one set for ease of use in the OSM environment and another for acceptance of OSM. These were as follows:

1. Concerning ease of use in the OSM environment, the item difficulties will not differ for markers with regards to:
 - The language (English or Chinese) that scripts are marked in
 - The type of question (extended essays or short-answer questions)
 - The subject (English or Chinese or LS)
2. Concerning acceptance of OSM, the item difficulties will not differ for markers with regards to:
 - The language (English or Chinese) that scripts are marked in
 - The type of question (extended essays or short-answer questions)
 - The subject (English or Chinese or LS)

The statistical approach in this study involved the use of Rasch measurement. Such an approach not only enabled the research questions above to be explored, it also permitted a robust scale with sound psychometric properties to be established from the items in the questionnaire.

This study originally appeared as: Yan, Z. and Coniam, D (2013). Assessing the ease of use in the environment and markers' acceptance of on screen marking: a Rasch measurement perspective. *Educational Research and Evaluation*, 19(5), 461–483.

Chapter 11

Chapter 11 is entitled 'The Increasing Acceptance of Onscreen Marking: The "Tablet Computer" Effect'. In this study, the marker sample was different from previous studies in that the subjects were younger markers who mainly had not previously marked for the HKEAA. In addition, these markers were marking for an extended period – 6 h or more in a single day. The study pursued the hypothesis that younger markers would, as a starting point, be more predisposed to marking on screen than would older markers. The study also hypothesised that, with the massive take-up of tablets, the younger generation of markers would be even more predisposed towards OSM, with ownership of a tablet resulting in a more positive attitude towards OSM.

There were, consequently, three hypotheses in the study which relate to marker attitude:

1. Markers of the short answers in the 2012 Hong Kong Advanced Level Use of English Examination would be more positive towards the OSM medium in their post-marking questionnaires than were HKALE Liberal Studies markers in the 2010 study.

2. Markers would be more positive towards the OSM medium in their post-marking questionnaire than in their pre-marking questionnaire.
3. Markers who personally owned a tablet would have a more positive attitude towards the OSM marking medium in both their pre- and post-marking questionnaires than markers who did not own a tablet.

This study originally appeared as: Coniam, D. (2013). The increasing acceptance of onscreen marking – the ‘tablet computer’ effect. *Journal of Educational Technology & Society*, 16(3), 119–129.

Chapter 12

Chapter 12 is entitled ‘The Effects of Key Demographic Variables on Markers’ Perceived Ease of Use and Acceptance of Onscreen Marking’. The major purpose of this study was to investigate the extent to which the different languages used to mark, gender and age affected markers’ perceived ease of use in the OSM environment and acceptance of OSM. The research questions were formulated as follows:

1. What are the effects of the language of marking (English, Chinese or both), gender, and age on markers’ perceived ease of use in the OSM environment?
2. What are the effects of the language of marking (English, Chinese or both), gender, and age on markers’ perceived acceptance of OSM?

This study originally appeared, in a slightly different version, as: Yan, Z., and Coniam, D. (2014). The effects of key demographic variables on markers’ perceived ease of use and acceptance of onscreen marking. *Assessment in Education: Principles, Policy & Practice*, 21(4), 464–480.

Chapter 13

Chapter 13 is entitled ‘A Comparative Picture of the Ease of Use and Acceptance of Onscreen Marking by Markers Across Subject Areas’. The major focus involved comparing marker reactions from the wider perspective of all the subject areas marked by OSM for the first time in 2012. The research questions were framed as:

1. What are the effects of subject area on markers’ perceived ease of use in the OSM environment?
2. What are the effects of subject area on markers’ perceived acceptance of OSM?

Chapter 13 describes the final study in the series of validation studies described in the book. It recounts how *all* subject areas were marked by OSM in the 2012 administration of Hong Kong’s public school examinations. It was thus a fitting opportunity to see whether, overall, OSM worked in terms of validity for future use.

This study originally appeared as: Coniam, David and Yan, Zi. (2015). A comparative picture of the ease of use and acceptance of onscreen marking by markers across subject areas. *British Journal of Educational Technology*, doi: [10.1111/bjet.12294](https://doi.org/10.1111/bjet.12294).

Chapter 14

The book ends with the concluding chapter, Chap. 14, that summarises the studies that were described throughout the book and discusses the major findings in the studies, any weaknesses or problems that were detected which would need to be faced by HKEAA, and the overall findings and outcomes of the studies.

An important element within the book is the ways in which feedback from stakeholders was used to initiate further studies, as in Chap. 8, for example, where concerns of stakeholders that dissatisfied markers might not mark as accurately or reliably as non-dissatisfied markers were addressed in a qualitative, in-depth research study.

It should be noted that apart from wishing to provide an accessible, coherent account of the nine validation studies, the authors also wanted to provide stakeholders in various jurisdictions worldwide with potential templates for validating their own OSM processes and implementations by replicating the Hong Kong validation studies.

Note: It should be noted that the term ‘marker’ is used throughout the book although the term ‘rater’ was used in some of the papers which have been revised and re-written in Chaps. 5, 6, 7, 8, 9, 10, 11, 12, and 13. The reason for this is that the term ‘marker’ has sometimes been used to refer to those who award marks for short-answer or multiple-choice answers and ‘rater’ has sometimes been used to refer to those who mark performance examinations, e.g. those that involve writing and speaking. We have chosen *not* to use that distinction. Thus, we have chosen to use the one term ‘marker’ only.

Tai Po, Hong Kong

David Coniam
Peter Falvey

Reference

- Coniam, D. (2009a). A comparison of onscreen and paper-based marking in the Hong Kong public examination system. *Educational Research and Evaluation*, 15(3), 243–263.
- Geertz, C. (1973). Thick description: Toward an interpretative theory of culture. In *The interpretation of cultures: Selected essays* (pp. 3–30). New York: Basic Books.