RICHARD M. LUECHT, PHD

BUSINESS

HOME

University of North Carolina at Greensboro
Educational Research Methodology
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Greensboro, NC 27455-2233

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AREAS OF EXPERTISE

- Design engineering and implementation of comprehensive, large-scale computer-based testing systems
- Assessment engineering of templates and data models for test items and performance assessment tasks
- Automated test assembly algorithms and heuristics, including systems integration with item banking applications
- Computer-adaptive testing, including multidimensional item response theory applications and multistage testing applications
- Scoring models for complex performance assessments
- Standard setting methods
- Item response theory estimation techniques

EDUCATION

Ph.D. Degree, School of Education-Urban Education, University of Wisconsin, Milwaukee, WI, 1989. Major in Educational Psychology (Emphasis on Research, Measurement & Evaluation) and minor in Speech & Language Science. Dissertation title: *A Comparison of Applied Methods for Estimating Variance Components under Large, Random Effects Designs with Unbalanced Data.*

M.S. Degree, University of Wisconsin, Milwaukee, WI, 1985. Major in Educational & Psychological Research, Measurement and Evaluation

B.S. Degree, Carroll College, Waukesha, WI, 1978. Major in Psychology and minor in Political Science

<u>EXPERIENCE</u>

1999-present. *Professor, Educational Research Methodology (Tenured).* University of North Carolina at Greensb**oro, School of Education, Greensboro, North Carolina.** *Director of the Center for Educational Research and Evaluation at UNCG (1999-2005). ERM Department Chair (Fall 1999 to Spring 2002). Director of Graduate Studies (1999-2002, 2011-present)*

1994-1998. *Senior Psychometrician & Director, Computerized Adaptive Testing Research*, Psychometrics Division, National Board of Medical Examiners (NBME), Philadelphia, Pennsylvania.

1989-1994. *Psychometrician I* and *Psychometrician I*I. ACT, Inc. (formerly American College Testing), Iowa City, Iowa.

1984-1989. *Instructor/Lecturer.* School of Allied Health Professions, University of Wisconsin—Milwaukee, Milwaukee, Wisconsin.

1982-1984. *Proposal Coodinator.* Harris Corporation, Government Systems Division. Melbourne, Florida.

1979-1982. *Testing Program Coordinator.* Manpower, Inc., Milwaukee, Wisconsin.

<u>PROFESSIONAL AFFILIATIONS & SERVICE</u>

<u>Awards</u>:   Samuel J. Messick Memorial Lecture Award given by Educational Testing Service TOEFL Program, 2001.

<u>Active Memberships</u>: (1) American Educational Research Association; (2) National Council on Measurement in Education; (3) Psychometric Society. Also, past **Treasurer** of the Psychometric Society (1991-1995)

<u>University Service (UNCG)</u>: Chair/co-chair of five ERM search committees for faculty members (1999-2013). **Chair** of the following School of Education (SOE) committees: (1) Search Committee for SOE Web-Coordinator position (2002); Search Committee for Web and Multimedia Services position (2004), Search Committee for ERM Assistant Professors (2006, 2010, 2012), ERM Department Chair position (2011), ERM Associate/Full Professor position (Eval., 2013); Research Symposium Planning Task Force (2002-3); Nominations and Elections Committee (2002-2006). **Member** of the following committees: Graduate School Dean Search (2002); ERM Clinical Faculty Search Committee (2012) School of Education Dean Search (2001); UNCG Research Advisory Committee, Office of the Associate Provost for Research (2002-present); UNCG Committee on Committees (2002-2006); UNCG Technology Transfer Advisory Panel (2003-present); SOE Curriculum Committee (2001-2003, 2005-present); SOE Recruitment and Alumni Relations Committee (1999-2002); SOE

Faculty Promotions and Tenure Committee (1999-present); Graduate School Faculty (1999-present); SOE Executive Council (1999-2002); SOE Human Subjects Committee (1999-2000); SOE Faculty Grievance Committee (1999-2001)

Scholarly Service:

Software Review Editor for *Applied Psychological Measurement*
Past Advisory Editor for the *Journal of Educational Measurement*

Journal manuscript reviewer for *Psychometrika*, *Applied Psychological Measurement*, *International Journal of Testing*, *Research Quarterly for Exercise and Sport*, *Journal of Educational Measurement*, *Measurement Issues & Practices*, *Journal of Educational and Behavioral Statistics*, *Applied Measurement in Education, Allied Health Sciences Education*, *Academic Medicine*, *Annals of Operations Research*, and *Psychometrika*

Conference paper **reviewer** and **discussant**: (1) American Educational Research Association, (2) National Council on Measurement in Education, (3) Research in Medical Education; (4) the Ottawa Conference on Medical Education; (5) the Association of American Medical Colleges Graduate Student Research Program

Proposal reviewer for the National Board of Medical Examiners (NBME) Medical Education Research Fund, 2000-2004, 2007. Reviewer for the Creative Industries of NWO, the Dutch Research Council, 2012-13.

Book reviewer for Kluwer, Sage Publications, Spring-Verlag New York, and Lawrence Erlbaum and Associates.

Member of the Technical Achievement Award Committee for the National Council on Measurement in Education (1996-7). Member of the Career Achievement Award Committee for the National Council on Measurement in Education (2003-2006).

Chair, Career Achievement Award Committee for the National Council on Measurement in Education (2004-5).

Boards, Committees, and Professional Advisory Service

Member of the **PARCC Consortium of States Technical Advisory Committee**. Planning and advisory group for Race-to-the-Top assessments in the U.S.

Member of the **Delaware Department of Education Technical Advisory Committee** for the DCAS, working with the Delaware Department of Education. Advisory activities on assessment development, psychometrics, and research. January 2010 to present.

Member of the **Puerto Rico Department of Education Technical Advisory Committee**. Advisory activities on assessment development, psychometrics, and research. January 2009 to present.

Member of the **New York Department of Education Technical Advisory Committee**. Advisory activities on assessment development, psychometrics, and research. January 2012 to present.

Member of the **Pennsylvania Department of Education Technical Advisory Committee**. Advisory activities on assessment development, psychometrics, and research. October 2012 to present.

Member of the **Pennsylvania Department of Education Educator Effectiveness Technical Advisory Committee**. Advisory activities on assessment development, psychometrics, and statistical modeling research for teacher accountability. March 2013 to present.

Senior Psychometric Advisor, **Prometric, Inc.**, Baltimore, MD. Advising on advanced psychometrics issues related to computer-based testing.

Member of the **Technical Advisory Group for the National Board of Professional Teaching Standards (NBPTS) Accomplished Principals Assessment Development Project**, March 2010 to present. Consulting on assessment design, supporting research and psychometrics.

Chair of the **Psychometric Advisory Team for the Advanced Placement (AP) Re-design Research Project** for The College Board, 2005-present. Direct research planning and evaluate progress on redesigning test development practices and psychometric support procedures for multiple administrations of the AP examinations in the future

Member of the **High-Stakes Digital Testing (HS-DT) Technical Advisory Group**, The College Board, 2010-2013. Advising on large-scale computerization and test design issues for the digital SAT initiative.

Member of the **Research Advisory Panel** for The College Board, 2004-2007. Oversee funding allocations and research priorities for the College Board's Research Division

Member of the **Diagnostic Methods Committee**, The College Board, 2003-2007. Provide technical advice and conduct research for The College Board, reporting the Research Advisory Panel, regarding technical test development and psychometric options for diagnostic and formative score reporting for large-scale K-16 assessments

Member of the **Visiting Research Panel for Educational Testing Service (ETS)**, Princeton, NJ, 2001-2008. Participate in reviewing state-of-the-art psychometric research at ETS (assuming role of **Chair** of the VPR in Fall, 2006)

Member of the **North Carolina Department of Public Instruction's Technical Advisory Committee**, 2000 to present. Advisor on technical psychometric issues related to the North Carolina DPI K-12 state EOG, EOG, and alternative assessment testing programs

Member of the **Georgia Department of Education's Technical Advisory Committee**, 2001 to present. Advisor on technical psychometric issues related to the Georgia state K-12 testing programs

Member of the **Georgia Department of Education Educator Effectiveness Technical Advisory Committee**. Advisory activities on assessment development, psychometrics, and statistical modeling research for teacher accountability. June 2011 to present.

External psychometric advisor/evaluator for **New Jersey Department of Education Technical Advisory Committee**, 2006-present. Advisor on technical equating and other psychometric issues related to the NJ K-12 state testing programs

Consultant to the **Association of American Medical Colleges** on issues related to computerizing the Medical College Admissions Test (February, 2004)

Technical consultant to the **Defense Language Institute** (DLI) and **National Security Agency** (NSA), 2001 to 2005. Provide technical advise on psychometric modeling of language proficiency associated with the Interagency Language Roundtable (ILR) Proficiency Scale, as well as software engineering advice related to designing and implementing psychometric and test development software systems and procedures associated with converting the Defense Language Proficiency Tests (DLPT) in Reading Comprehension and Listening Comprehension to multilingual, computer-adaptive multistage tests

Member of the **Exam Development Advisory Committee** for the Medical Council of Canada, Ottawa, Canada, 1998-2006. Advisor on technical implementation and research related to the Qualifying and Clinical Reasoning Examinations, Ottawa, Canada

Member of the **Program Review Advisory Committee** for the Medical College Admissions Test (MCAT), Association of American Medical Colleges, Washington, DC, 1999-2002

Technical Design and Psychometric Consultant on Innovative Item Types Project for the Windows™ 2000 Examinations, **Microsoft Corporation**, Redmond, WA, 1999-2003

Chair/member of the **Technical Research and Implementation Oversight** (TRIO) committee for the American Institutes of Certified Public Accountants, Ewing, NJ, 2000-

2008. Technical braining-storming group on high-level research priorities and potential solutions for the AICPA (with Dr. Wim van der Linden, University of Twente, and Dr. Ron Hambleton, University of Massachusetts, Amherst)

Member of the **Board of Examiners for the American Institute of Certified Public Accountants** (AICPA), Ewing, NJ, 2000-2004. Policy oversight for the Uniform CPA Examination

Member of the **Psychometric Oversight Committee for the American Institute of Certified Public Accountants** (AICPA), Ewing, NJ, 1999-2005. Psychometric research policy and technical oversight for research on the Uniform CPA Examination

Member of the **Research Consortium for the American Institute of Certified Public Accountants** (AICPA), Jersey City, NJ, 1999-2004. Psychometric research for 2003 implementation of the Uniform CPA Examination

Member of the **Simulations Development Task Force for the American Institute of Certified Public Accountants** (AICPA), Jersey City, NJ, 1999-2002. Research and development for innovative assessments for the Uniform CPA Examination

Member of the **Committee of Examiners for the Test of English as a Foreign Language** (TOEFL), ETS, Princeton, NJ, 2000-2004. Language testing research oversight for the TOEFL program. Also member of the COE Test Development subcommittee for TOEFL

Member of the **Board of Examiners for the Test of English as a Foreign Language** (TOEFL), ETS, Princeton, NJ, 2001-2003. Policy advising and oversight for the TOEFL program

Member of the **Scientific Advisory Board for Ordinate Systems, Inc.**, Menlo Park, CA, 2001-2005. Provide technical advice on technological assessment issues related to language testing and speech/language recognition

Member of the **Peer Review Panel for the Phase 1 Small Business Innovative Research and Small Business Technology Transfer Program**, sponsored by the National Science Foundation, September, 2001

GRANTS AND CONTRACTS

Principle investigator. *Understanding Critical Decision-Making in the Context of Extended Response Item Types: Implications for Designing, Calibrating and Scoring Extended Response Items Types*. National Council of State Boards of Nursing, 2014-2015. **($63,722)**.

Principal investigator. *ca-MST Simulation and Analysis Research for HS-DT Project*. The College Board, 2010-11. **($42,291)**.

Co-principal investigator. Psychometric research consulting and support for the PROMIS Sexual Functioning Grant (subcontract with Duke University). National Institutes for Health (NIH), 2010 to 2014. (**$209,000**)

Co-principal investigator on the National Commission on Certification of Physicians Assistants psychometric research project, Fall 2008-Summer, 2009 ($**15,000**)

Co-principal investigator on the National Commission on Certification of Physicians Assistants stake-holder survey project, Fall 2005-Spring, 2006 ($**35,000**)

Principal investigator on National Board of Professional Teaching Standards grant. Proposal title, *Scaling The NBPTS Assessments: An Investigation Of Dichotomous Holistic Scoring And Latent Class Analysis For Possibly Multidimensional Performance Assessments*. (**$63,790**). Active grant: (initiated, 2002; awarded for 2003-4)

Principal investigator on American Institutes of Certified Public Accountants research contract to investigate issues related to computerizing the Uniform CPA Examination. $**300,000** over five years. (Academic years: 1999-0 to 2003-4)

Principal investigator, contract with Jos. Bryan Foundation for program evaluation study to assess effects of Paideia implementation in Guilford County Schools. $**50,000** per year, 1999-2001

Principal investigator on the Microsoft, Inc. contract to provide psychometric and research services computerizing the Uniform CPA Examination. $**150,000** for a 12-month contract, Sept. 2000 to Sept, 2001.

RESEARCH & SCHOLARSHIP ACTIVITIES
1
A. PUBLICATIONS (in chronological-first author order**)**

Luecht, R. M. (2015). Computer-based test delivery models, data, and operational implementation issues. In F. Drasgow (Ed.), *Technology and testing*, pp. 179-205. New York: Routledge.

Luecht, R. M. (2015). Applications of item response theory: Item and test information functions for designing and building mastery tests. In S. Lane, M. Raymond & T. Haladyna (Eds.). *Handbook of test development 2nd edition*, pp. 485-506. New York: Routledge.

Luecht, R. M. (2014). Computerized adaptive multistage design considerations and operational issues (pp. 69-83). In D. Yan, A. A. von Davier & C. Lewis (Eds.) *Computerized Multistage Testing: Theory and Applications*. London, UK: CRC Press/ Taylor & Francis Group.

Luecht, R. M. (2013). Assessment engineering task model maps, task models and templates as a new way to develop and implement test specifications. *Journal of Applied Testing Technology, 14* (www.testpublishers.org/journal-of-applied-testing-technology).

Shu, Z.; Henson, R. & Luecht, R. (2013). Using deterministic, gated item response theory model to detect test cheating due to item compromise. *Psychometrika, 78*, 481-49.

Clark, D. B.; Martinez-Garza, M.; Biswas, G;. Luecht, R. M.; & Sengupta, P. (2012). Driving Assessment Of Students' Explanations in Game Dialog Using Computer-Adaptive Testing and Hidden Markov Modeling. In D. Ifenthaler; D. Eseryel; X. Ge (Eds.), *Assessment in Game-based Learning: Foundations, Innovations, and Perspectives, pp. 173-200*. New York: Springer.

Luecht, R. M. (2012). Computer-Based and Computer-Adaptive Testing. In K. Ercikan, M. Simon & M. Rousseau (Eds.), *Improving Large Scale Assessment in Education: Theory, Issues, and Practice,* pp. 91-114,. New York: Taylor-Francis/Routledge.

Luecht, R. M. (2012). An Introduction to Assessment Engineering for Automatic Item Generation. In M. Gierl & T. Haladyna (Eds.), *Automatic item Generation*, pp. 59-101. New York: Taylor-Francis/Routledge.

Luecht, R. M. (2012). Automatic item generation for computerized adaptive testing. In M. Gierl & T. Haladyna (Eds.), *Automatic item Generation*, pp. 196-216. New York: Taylor-Francis/Routledge.

Luecht, R. M. (2012). Operational CBT Implementation Issues: Making It Happen. In R. Lissitz & H. Jiao (Eds.), *Computers and Their Impact on State Assessments: Recent History and Predictions for the Future*. Baltimore, MD: Information Age Publishers.

Raymond, M. R.; & Luecht, R. M. (2012). Licensure and Certification Testing. In K. F. Geisinger (Ed). *APA Handbook of Testing and Assessment in Psychology*. APA Publications.

Luecht, R. M. & Sireci, S. G. (2011). *A Review of Models for Computer-Based Testing*. New York., NY: The College Board, Research Report, 2011-12.

Zenisky, A.; Hambleton, R. J.; & Luecht, R. M. (2010). Multistage Testing: Issues, Designs, and Research. In W. J. van der Linden and C. E. W. Glas (Eds). *Elements of Adaptive Testing*, pp. 355-372. New York: Springer.

Luecht, R. M. (2009). Book Review of *Linear Models for Optimal Test Design* by Wim J. van der Linden. *Journal of Educational Measurement, 33*, 238-243.

Blue, A. V.; Crandall, S.; Nowacek, G.; Luecht, R. M.; Swick, H. (2009). Assessment of matriculating medical students' knowledge and attitudes towards professionalism. *Medical Teaching, 13*, 1-5.

Luecht, R. M. (2007). Using information from multiple-choice distractors to enhance cognitive-diagnostic score reporting. In Jacqueline P. Leighton & Mark J. Gierl (Eds). *Cognitive diagnostic assessment for education: theory and applications, pp. 319-340*. London: Cambridge University Press.

Drasgow, F.; Luecht, R. M.; & Bennett, R. (2006). Technology and Testing. In R. L. Brennan (Ed.), *Educational Measurement, 4th Edition, pp. 471-515*. Washington, DC: American Council on Education/Praeger Publishers.

Luecht, R. M.; Brumfield, T.; and Breithaupt, K. (2006). A Testlet Assembly Design for the Uniform CPA Examination. *Applied Measurement in Education*, 19, 189-202.

Luecht, R. M. (2006). Designing Tests for Pass/Fail Decisions Using IRT. In S. Downing & T. Haladyna (Eds.). *Handbook of Test Development* (pp. 575-596). Mahwah, NJ: Lawrence Erlbaum and Associates.

Luecht, R. M. (2006). Operational Issues in Computer-Based Testing. In D. Bartrum and R. Hambleton (Eds). *Computer-Based Testing and the Internet,* (pp. 91-114). West Sussex, England: John Wiley & Sons Ltd..

Luecht, R. M. (2005). Some Useful Cost-Benefit Criteria for Evaluating Computer-based Test Delivery Models and Systems. *Journal of Applied Testing Technology.*7(2), (www.testpublishers.org/journal.htm)

Luecht, R. M. (2005). Item Analysis. In B. Everitt & D. Howell (Eds), *Encyclopedia of Statistics in Behavioral Science*. West Sussex, UK: John Wiley & Sons, Ltd.

Luecht, R. M. (2005). Computer-Adaptive Testing. In B. Everitt & D. Howell (Eds), *Encyclopedia of Statistics in Behavioral Science*. West Sussex, UK: John Wiley & Sons, Ltd.

Luecht, R. M. (2005). Computer-Based Testing. *Encyclopedia of Social Measurement, Volume 1*. Elsevier, Inc, 419-427.

Luecht, R. M. (2004). Multistage complexity in language proficiency assessment: A framework for aligning theoretical perspectives, test development, and psychometrics. *Foreign Language Annals*, 36(4), 518-526.

Myers, J. E., Luecht, R. M., & Sweeney, T. J. (2004). Examining the Five-Factor Wel Inventory: Results Of An Exploratory Factor Analysis. *Journal of Counseling and Development.*

Luecht, R. M. & Clauser, B. (2002). Test models for complex computer-based testing. In C. Mills, M. Potenza, J. Fremer, and W. Ward (Eds.) *Computer-based Testing: Building the Foundation for Future Assessments*, pp. 67-88. Mahwah, NJ: Erlbaum.

Luecht, R. M. & Sireci, S. G. (October, 2002). *Description and Evaluation of Models for Computer-Based Testing*. Commissioned Technical Report for the College Board.

Pitoniak, M. J., Sirici, S. G. & Luecht, R. (2002). A multitrait-multimethod validity investigation of scores from a professional licensure examination. *Educational and Psychological Measurement*, 62(3), 498-516.

Luecht, R. M. and Baker, W. K. (2000). *Evaluating the Paideia Program in Guilford County Schools, Second Year Report: 1999-2000.* University of North Carolina at Greensboro: Center for Educational Research and Evaluation.

Luecht, R. M. & Nungester, R. J. (2000). Computer-adaptive sequential testing. In C. Glas & W. J. van der Linden (Eds). *Computer-Adaptive Testing*, pp. 117-128. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Luecht, R. M. (1999). The practical utility of Rasch measurement models. In M. Chalhoub-Deville (Ed.) *Studies in Language Testing: Issues in Computer-Adaptive Testing of Reading Proficiency* (pp. 192-211). New York: Cambridge University Press.

Luecht, R. M., Baker, W. K. & Karkee, T. (1999). *Evaluating the Paideia Program in Guilford County Schools, Second Year Report: 1998-1999.* University of North Carolina at Greensboro: Center for Educational Research and Evaluation.

Hadadi, A. & Luecht, R. M. (1998) Some methods for detecting and understanding test speededness on timed multiple choice tests. *Academic Medicine*, *73,* 47-50.

Luecht, R. M., Hadadi, A., Swanson, D. B. & Case, S. M. (1998). A comparative study of a comprehensive basic sciences test using paper-and-pencil and computerized formats. *Academic Medicine, 73*, 51-53.

Luecht, R. M. (1998). Computer-assisted test assembly using optimization heuristics. *Applied Psychological Measurement, 22*, 224-336.

Luecht, R. M. (1998). A reaction to "moderating possibly irrelevant multiple score mean differences on a test of mathematical reasoning". *Journal of Educational Measurement, 35*, 223-225.

Luecht, R. M. (1998). Automated test assembly (ATA) in the era of computerized testing. *CLEAR Exam Review*. Fall Issue.

Luecht, R. M. & Nungester, R. J. (1998). Some practical applications of computerized adaptive sequential testing. *Journal of Educational Measurement*, 35, 229-249.

van der Linden, W. J. & Luecht, R. M. (1998). Observed-score equating as a test assembly problem. *Psychometrika*, *63*, 401-418.

Clauser, B. E., Ross, L. P., Luecht, R. M., Nungester, R. J. & Clyman, S. G. (1997). Using the Rasch model to equate forms for performance assessments of physician's clinical skills. In A. Scherpbier, C. van der Vleuten, J. Rethans and A. van der Steeg, (Eds.). *Advances in Medical Education*, pp. 416-419. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Luecht, R. M., DeChamplain, A., Nungester, R. J. (1997). Maintaining content validity in computerized adaptive testing. In A. Scherpbier, C. van der Vleuten, J. Rethans and A. van der Steeg, (Eds.). *Advances in Medical Education*, pp. 416-419. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Luecht, R. M., DeChamplain, A., Nungester, R. J. (1997). Maintaining content validity in computerized adaptive testing. *Advanced in Health Sciences Education*, 3, 29-41.

Luecht, R. M. (1996). Multidimensional computerized adaptive testing in a certification or licensure context. *Applied Psychological Measurement, 20*, 389-404.

Luecht, R. M. (1996). The practical utility f Rasch measurement models. In M. Chalhoub-Deville (Ed.). *Issues in Computer-Adaptive Testing of Reading Proficiency*, pp. 196-223. New York: Cambridge University Press.

van der Linden, W. J. & Luecht, R. M. (1996). An optimization model for test assembly to match observed score distributions. In G. Englehard & M. Wilson (Eds.). *Objective Measurement: Theory into Practice (Volume 3)*. Norwood, NJ: Ablex.

Luecht, R. M. (1995). *An Introduction to Computerized Adaptive Testing*. Philadelphia, PA: NBME Technical Report.

Loomis, S., Luecht, R. M. & Reckase, M. R. (1993). *Setting Achievement Levels on the 1992 National Assessment of Educational Progress in Mathematics, Reading, and Writing: A Technical Report on Reliability and Validity.* Iowa City, IA: American College Testing.

Luecht, R. M. (1993). *Interpolating θ for the partial credit model*. In Loomis, S., Luecht, R. M. & Reckase, M. R.. *Setting Achievement Levels on the 1992 National Assessment of Educational Progress in Mathematics, Reading, and Writing: A Technical Report on Reliability and Validity.* Iowa City, IA: American College Testing.

Luecht, R. M. (1993). *Some results from the NAGB ALS project in reading.* In Loomis, S., Luecht, R. M. & Reckase, M. R.. *Setting Achievement Levels on the 1992 National Assessment of Educational Progress in Mathematics, Reading, and Writing: A Technical Report on Reliability and Validity.* Iowa City, IA: American College Testing.

Meisner, R.; Luecht, R. M.; & Reckase, M.R. (1993). *Statistical characteristics of items generated by computer algorithms, ACT Research Report Series, RR-93-9.* Iowa City, IA: ACT, Inc..

Luecht, R. M. & Hirsch, T. M. (1992). Item selection using an average growth approximation of target information functions. *Applied Psychological Measurement*, 16(1), 41-51.

Smith, P. L. & Luecht, R. M. (1992). Correlated effects in generalizability studies. *Applied Psychological Measurement*, 16(3), 229-235.

Luecht, R. M. & Miller, T. R. (1992). Unidimensional calibrations and interpretations of composite traits for multidimensional tests. *Applied Psychological Measurement*, 16(3), 279-293.

Luecht, R. M. & Hirsch, T. M. (1990). Computerized test construction using an average growth approximation of target information functions. Iowa City, IA: *ACT Research Report Series*, 90-6.

Luecht, R. M., Madsen, M. K., Taugher, M. P. & Petterson, B. J. (1990). Assessing professional perceptions: design and validation of an interdisciplinary education perception scale. *Journal of Allied Health, 19(2)*, 181-191.

Luecht, R. M., Madsen, M. K. & Sander, E. (1989). A multidimensional model for computer training of allied health faculty. *Improving University Teaching, 2*, 207-216.

Luecht, R. M., Madsen, M. K. & Sander, E. (1988). A multidimensional model for computer training of allied health faculty. 5th Annual Academic Chairpersons Conference, Orlando, Florida: *Issues in Higher Education: Proceedings from the 5th Annual Academic Chairpersons Conference, 28*, 270-277.

Madsen, M. K., Taugher, M. P. & Luecht, R. M. (1988). Marital counseling and family therapy with one or more mentally retarded adults. 8th Annual World Congress of the International Association for the Scientific Study of Mental Deficiency, Dublin, Ireland: *AWCIA-SSMD Proceedings*.

Madsen, M. K., Taugher, M. P. & Luecht, R. M. (1988). When the mother is mentally retarded. Paper presented at the 8th Annual World Congress of the International Association for the Scientific Study of Mental Deficiency, Dublin, Ireland. Published in *1988 AWCIA- SSMD Proceedings*.

Luecht, R. M. (1987). Test Pac: A program for comprehensive item and reliability analysis. *Journal of Educational and Psychological Measurement., 47(3)*, 623-626.

Luecht, R. M., Madsen, M. K. & Sander, E. (1987). A model for computer-training of allied health professionals. AAMSI Congress, San Francisco: *Proceedings: American Association for Medical Systems and Informatics Congress*, 367-371.

Luecht, R. M. (1986). Determining sample sizes in productivity and cost analysis, *Wisconsin Medical Records Association, Special Edition, 35(4)*, 6.

B.   BOOKS AND BOOK CHAPTERS IN PREPARATION (alphabetical order)

Luecht, R. M. (in press). Calibrating technology-enhanced items. Handbook of item response theory, 2nd edition. (Accepted, waiting for revision recommendations).

Luecht, R. M. (in press). Applications of item response theory item and test information functions for designing and building mastery and criterion-referenced tests. In T. Haladyna, S. Lane & M. Raymond (Eds.). *Handbook of Test Development, 2nd Edition.* Taylor-Francis.

Luecht, R. M. (in press). Computer-based test delivery models, data and operational implementation issues. In F. Dragow (Ed.). *Testing and Technology*. Commissioned volume to be published with support from the National Council on Measurement in Education.

Luecht, R. M. (in preparation). Assessment Engineering. Textbook.

C. CONFERENCE PAPERS & PRESENTATIONS (in chronological-alphabetical order**)**

Luecht, R. M. (2013, May). *Operational Design and Implementation Issues for Large-Scale Multistage Testing*. Invited symposium paper presented at the Annual Meeting of the National Council on Measurement in Education, San Francisco.

Luecht, R. M. (2012, November). *IRT Models, Calibration, and Diagnostics for Complex Item Types*. Invited keynote address at the Ronference, University of Amherst.

Luecht, R. M. (2012, July). *Engineering the Design of Assessment Task Models and Templates*. Invited keynote address at the International Test Commission Annual Meeting, Amsterdam, The Netherlands.

Luecht, R. M. (2012, May). *A Case for Computerized Adaptive Multistage Testing (ca-MST)*. Invitational Research Symposium on Technology Enhanced Assessments, Washington, DC.

Dallas, A., Wang, X., Furter, R. & Luecht, R. M. (2012, April). *Item Pool Size, Targeted Item Writing, and Panel Replication Strategies for a 1-3-3 Multistage Test Design*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Vancouver, BC Canada.

Luecht, R. M. (2012, April). *Assessment Engineering Task Model Maps, Task Models and Templates as a New Way to Develop and Implement Test Specifications*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Vancouver, BC Canada.

Luecht, R. M. (2012, April). *Computerized Adaptive Multistage Design Considerations.*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Vancouver, BC Canada.

Wang, X., Fluegge, L. & Luecht, R. M. (2012, April). *A Large-scale Comparative Study of the Accuracy and Efficiency of ca-MST Panel Design Configurations*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Vancouver, BC Canada.

Willse, J. T., Ackerman, T. A. & Luecht, R. M. (2012, April). An Overview of ca-MST: From Panel Configurations to Test Assembly. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Vancouver, BC Canada.

Xiao, L., Luecht, R. M., Godfrey, K., Sweeney, K., & Melican, G. (2012, February). *On the Technical Treatment of Guessing Behaviors in the Context of Formula-Scoring Instructions*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Vancouver, BC Canada.

Luecht, R. M. (2012, February). *Implementing Automated Test Assembly (ATA)*. Paper presented at the Annual Meeting of the Association of Test Publishers, Palm Springs, CA.

Luecht, R. M. (2012, February). *Principled Item Design Using Assessment Engineering*. Paper presented at the Annual Meeting of the Association of Test Publishers, Palm Springs, CA.

Luecht, R. M. (2011, August). *Assessment Engineering in Test Design, Development, Assembly, and Scoring*. Invited workshop presented at the Defense Manpower Data Center, Monterrey, CA.

Luecht, R. M. (2011, August). AE Task Models, Templates & Items. Invited workshop presented at the Defense Manpower Data Center, Monterrey, CA.

Luecht, R. M. (2011, April). *Future of Directions for Testing*. Invited panel discussion at the Annual Summit of the Performance Testing Council, Chevy Chase, MD.

Shu, Z.; Luecht, R.; & Henson, R. (2011, April). *Using the Deterministic, Gated IRT Model to Monitor Item Over-Exposure*. Paper presented at the Annual Meeting of the National Commission on Measurement in Education, New Orleans.

Luecht, R. M. (2011, March). *Assessment Design and Development, Version 2.0: From Art to Engineering*. Invited, closing keynote address at the Annual Meeting of the Association of Test Publishers, Phoenix, AZ.

Luecht, R. M. (2010, October). *Operational CBT Implementation Issues: Making It Happen*. Invited keynote address at Tenth Annual Maryland Assessment Conference: Computers and Their Impact on State Assessments: Recent History and Predictions for the Future, College Park MD.

Luecht, R. M. (2010, April). *The Influence and Impact of Technology on Educational Measurement*. Invited graduate student symposium presentation at the Annual Meeting of the National Council on Measurement in Education, Denver, CO.

Luecht, R. M. (2010, April). *Controlling Difficulty and Security for Complex Computerized Performance Exercises Using Assessment Engineering.* Paper presented at the Annual Meeting of the National Council on Measurement in Education, Denver, CO.

Luecht, R. M. (2010, April). *Some Small Sample Statistical Quality Control Procedures for Constructed Response Scoring in Language Testing.* Paper presented at the Annual Meeting of the National Council on Measurement in Education, Denver, CO.

Luecht, R. M., Dallas, A., & Steed, T. (2010, April). *Developing Assessment Engineering Task Models:A New Way to Develop Test Specifications*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Denver, CO.

Masters, J. S. & Luecht, R. M. (2010, April). *Assessment Engineering Quality Assurance Steps: Analyzing Sources of Variation in Task Models and Templates*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Denver, CO.

Shu, Z., Burke, M., & Luecht, R. M. (2010, April). *Some Quality Control Results of Using a Hierarchical Bayesian Calibration System for Assessment Engineering Task Models, Templates, and Items*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Denver, CO.

Luecht, R. M.; & Masters, J. (2010, February). *The Efficiency of Calibrating Multiple-Item Templates and Task Models Using a Hierarchical Calibration Model*. Paper presented at the Annual Meeting of the Association of Test Publishers, Orlando, FL.

Luecht, R. M. (2009, June). *Adaptive Computer-Based Tasks Under and Assessment Engineering Paradigm*. Paper presented at the 2009 GMAC Conference on Computerized Adaptive Testing, Minneapolis, MN (published online in *Proceedings*. http://www.psych.umn.edu/psylabs/catcentral/).

Luecht, R. M.; Burke, M.; Devore, R. (2009, April). *Task Modeling of Complex Computer-Based Performance Exercises.* Paper presented at the Annual Meeting of the National Council on Measurement in Education, San Diego, CA.

Luecht, R. M. (2008, October). *Assessment Engineering in Test Design, Development, Assembly, and Scoring*. Invited keynote address at the Annual Meeting of the East Coast Organization of Language Testers (ECOLT), Washington, D.C.

Goodman, J.; Luecht, R. M.; Zhang, O. (2008, April). *Scoring and Scaling Decisions in Tests with Complex Performance Assessment: Examining Item Dependencies and Dimensionality*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, New York.

Luecht, R. M. (2008, February). *Assessment Engineering.* Session paper at Assessment Engineering: Moving from Theory to Practice, Coordinated panel presentation at the Annual Meeting of the Association of Test Publishers, Dallas, TX.

Luecht, R. M. (2008, February). *The Application of Assessment Engineering to and Operational Licensure Testing Program*. Paper presened at the Annual Meeting of the Association of Test Publishers, Dallas, TX.

Luecht, R. M. (2007, October). *Multiple Objective Function, Multiple Constraint Set Optimization Models for Automated Test Assembly*. Invited paper presented at the Annual Meeting of International Conference on Advances in Interdisciplinary Statistics and Combinatorics, Greensboro, NC.

Luecht, R. M. (2007, October). *Assessment Engineering: An Integrated Approach to Test Design, Development, Assembly, and Scoring*. Invited keynote and workshop presented at the Performance Testing Council Summit, Scottsdale, AZ.

Luecht, R. M. (2007, June). *Emerging Topics (in CBT and CAT).* Invited keynote presentation at the 2007 GMAC® Conference on Computerized Adaptive Testing, Minneapolis, MN.

Luecht, R. M. (2006, May). *Engineering the Test: Principled Item Design to Automated Test Assembly.* Invited special event presentation at the Annual Meeting of the Society for Industrial and Organizational Psychology.

Luecht, R. M.; Gierl, M; Tan, X.; and Huff, K.. (2006, April). *Scalability and the Development of Useful Diagnostic Scales.* Paper presented at the Annual Meeting of the National Council on Measurement in Education, San Francisco, CA.

Luecht, R. M.; Nowacek, G. (2006, April). *Measuring and Predicting Professionalism in Medical School: From Knowledge and Attitudes to Clinic Practice.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Luecht, R. M. (2006, March). *Measuring Multidimensional Language Proficiency in a Multistage Adaptive Testing Context.* Invited paper presented at the University of Massachusetts-Amherst.

Luecht, R. M. (2006, February). *Computer-based Approaches to Diagnostic Assessment.* **Invited presentation** at the Annual Meeting of the Association of Test Publishers, Orlando, FL.

Luecht, R. M. (2005, April). *Some Useful Cost-Benefit Criteria for Evaluating Computer-based Test Delivery Models and Systems.* **Invited symposium paper** presented at the Annual Meeting of the National Council on Measurement in Education, Montreal, Quebec.

Luecht, R. M. (2005, April). *Extracting Multidimensional Information from Multiple-Choice Question Distractors for Diagnostic Scoring.* Paper presented at the Annual Meeting of the National Council on Measurement in Education, Montreal, Quebec.

Luecht, R. M. (2004, February). *Automated Test Assembly (ATA): Systems, Procedures and Practical Issues.* **Invited workshop and presentation** at the Annual Meeting of the Association of Test Publishers, Palm Springs/Indian Wells, CA.

Luecht, R. M. (2004, February). *Calibration and Scoring.* **Symposium presentation** at the Annual Meeting of the Association of Test Publishers, Palm Springs/Indian Wells, CA.

Luecht, R. M. (2004, February). *Measuring Multidimensional Language Proficiency in a Multistage Adaptive Testing Context.* **Invited presentation** at the Annual Meeting of the Association of Test Publishers, Palm Springs/Indian Wells, CA.

Luecht, R. M. (February, 2003). *Aggregated Performance-Based Standard-Setting Methodologies.* **Invited workshop and presentation** at the Annual Meeting of the Association of Test Publishers, Amelia Island, FL.

Luecht, R. M. (April, 2003). *Applications of Multidimensional Diagnostic Scoring For Certification And Licensure Tests.* Invited symposium paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL.

Luecht, R. M. (April, 2003). *Exposure Control Using Adaptive Multi-Stage Item Bundles*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL.

Luecht, R. M., & Burgin, W. (April, 2003). *Matching Test Design to Decisions: Test Specifications and Use of Automated Test Assembly for Adaptive Multi-Stage Testlets*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL.

Luecht, R. M. (February, 2002). *Setting Competency-Based Standards for Complex Performance-Based Tasks in Certification or Licensure Testing*. **Invited paper** presented at the Annual Meeting of the Association of Test Publishers, Carlsbad, CA.
Luecht, R. M. (February, 2002). *An Automated Test Assembly Heuristic for Multistage Adaptive Tests with Complex Computer-Based Performance Tasks*. **Invited paper** presented at the Annual Meeting of the Association of Test Publishers, Carlsbad, CA.

Luecht, R. M. (April, 2002). *From Design to Delivery: Engineering the Mass Production of Complex Performance Assessments*. Paper presented at the Annual Meeting of the National Council on Measurement in Education.

Luecht, R. M. (June, 2002). *Operational Issues in Computer-Based Testing.* **Invited keynote address** at the International Test Commission Conference on Computer-based Testing and the Internet, Winchester, England.

Luecht, R. M. (July, 2002). *Measuring Multidimensional Competency in a Multistage Adaptive Testing Context*. **Invited keynote address** at the US Defense Language Institute Foreign Computerized Adaptive Testing Conference, Monterey, CA.

Luecht, R. M., Brumfield, T., Breithaupt, K. (April, 2002). *A Testlet Assembly Design for the Uniform CPA Examination*. Paper presented (by T. Brumfield, UNCG graduate student) at the Annual Meeting of the National Council on Measurement in Education.

Brumfield, T., Burroughs, R. & Luecht, R. (April, 2001). *Optimal calibration sampling designs for the Uniform CPA Examination*. Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA.

Luecht, R. M. (2001, February). *New directions in computerized testing research*. **Invited keynote address** at the Annual Meeting of the Language Testing Research Colloquium, St. Louis, MO.

Luecht, R. M. (2001, April). *Challenges of web-based assessment*. **Invited symposium paper** at the Annual Meeting of the National Council on Measurement in Education, Seattle, WA.

Luecht, R. M. (2001, April). *Capturing, codifying and scoring complex data for innovative computer-based items*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, , Seattle, WA.

Luecht, R. M. (2001, August). *A systems engineering approach to computer-based testing*. **Invited paper** presented at the Defense Language Institute/National Security Agency Computer-Adaptive Testing Conference, Baltimore, MD.

Luecht, R. M. (2000, April). *Implementing the computer-adaptive sequential testing (CAST) framework to mass produce high quality computer-adaptive and mastery tests.* Symposium paper presented at the Annual Meeting of the National Council on Measurement in Education, New Orleans, LA.

Hadadi, A., Swanson, D. B. & Luecht, R. M. (1999, April). Practical issues in using automated test assembly (ATA) for large-scale testing. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Montreal, Quebec, Canada.

Iwamoto, C. K., Nungester, R. J. & Luecht, R. M. (1999, April). *Study of methods to detect aberrant response patterns in computerized testing*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Montreal, Quebec, Canada.

Luecht, R. M. (1999, April). *Trends in computerized testing-a synthesis*. **Invited presentation** for the Annual Meeting of the National Council on Measurement in Education, Montreal, Quebec, Canada.

Case, S.M., Luecht, R.M., & Swanson, D.B. (1998, April). *Design and automated assembly of test forms for the usmle step 1 field test.* Symposium conducted at the National Council on Measurement in Education Annual Meeting, San Diego.

Hadadi, A., & Luecht, R. M. (1998, April). *Effects of Response latency data in assessing speededness/non-speededness in computerized testing.* Paper presented at the Annual Meeting of the National Council on Measurement in Education, San Diego.

Hadadi, A., Luecht, R. M., Swanson, D. B., & Case, S. M. (1998, April). *Study 1: effects of modular subtest structure and item review on examinee performance, perceptions and pacing.* Symposium conducted at the National Council on Measurement in Education Annual Meeting, San Diego.

Iwamoto, C.K., Nungester, R.J., & Luecht, R.M. (1998, April). *Use of response similarity methods in multistage computer adaptive testing.* Paper presented at the Annual Meeting of the American Educational Research Association, San Diego.

Iwamoto, C.K., Nungester, R.J., Luecht, R.M., & Watson, S.A. (1998, April). *Effect of answer miskeys on the estimation of examinee abilities in multistage computer adaptive testing.*

Paper presented at the Annual Meeting of the American Educational Research Association, San Diego.

Swanson, D.B., Luecht, R.M., Gessaroli, M.E., & Nungester, R.J. (1998, April). *Study 3: impact of systematic manipulation of subtest difficulty on examinee performance, perceptions, and pacing.* Symposium conducted at the National Council on Measurement in Education Annual Meeting, San Diego.

Case, S.M. & Luecht, R.M. (1997, April). *Computer assembly of tests so that content reigns supreme.* Paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL. Symposium: *Outcomes of the 1996 USMLE Step 2 Field Test using a Computer Adaptive Sequential Paradigm.*

Hadadi, A. & Luecht, R. M. (1997, April). *Psychometric mode effects and fit issues with respect to item difficulty estimates.* Paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL. Symposium: *Outcomes of the 1996 USMLE Step 2 Field Test using a Computer Adaptive Sequential Paradigm.*

Luecht, R.M. (1998, April). *A framework for exploring and controlling risks associated with test item exposure over time.* Symposium conducted at the National Council on Measurement in Education Annual Meeting, San Diego.

Luecht, R.M., & De Champlain, A.F. (1998, April). *Applications Of Latent Class Analysis To Mastery Decisions Using Complex Performance Assessments.* Paper presented as a Symposium at the Annual Meeting of the American Educational Research Association, San Diego.

Luecht, R.M., Nungester, R.J., Swanson, D.B., & Hadadi, A. (1998, April). *Study 2: examinee performance, perceptions, and pacing on a computer adaptive sequential test.* Symposium conducted at the National Council on Measurement in Education Annual Meeting, San Diego.

van der Linden, W.J., & Luecht, R.M. (1998, April). *Observed-Score Pre-Equating: A Method and Some Empirical Results.* Paper presented at the Annual Meeting of the American Educational Research Association, San Diego.

Watson, S.A., Iwamoto, C.K., Nungester, R.J., & Luecht, R.M. (1998, April). *The use of response similarity statistics to study examinees who benefit from copying.* Paper presented at the National Council on Measurement in Education Annual Meeting, San Diego.

Iwamoto, C.K., Watson, S.A. Nungester, R.J. & Luecht, R.M. (1997, April). *Power of similarity methods and person fit analysis to detect copying behavior*. Presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL.

Luecht, R.M. (1997, April). *An adaptive sequential paradigm for managing multidimensional content*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL. Symposium: *Technical Issues in Multidimensional Adaptive Testing*

Luecht, R.M. (1997, April). *A didactic on data analysis for standard setting with Angoff-type ratings in an IRT context*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL. Symposium: *Applications of Technology in Setting Performance Standards: Practical Solutions and Residual Problems*.

Luecht, R.M. (1997, October). *Computer-adaptive sequential testing: a framework for mass producing high quality computer adaptive and mastery tests*. **Invited paper** presented at the Results '97 Conference, San Antonio, TX.

Luecht, R.M. & Nungester, R.J. (1997, April). *Overview Of The USMLE Step 2 Computerized Field Test*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL. Symposium: Outcomes of the 1996 USMLE Step 2 Field Test using a Computer Adaptive Sequential Paradigm.

Swanson, D.B., Featherman, C. F., Case, S.M. & Luecht, R.M. (1997, April). *Relationship Of Response Latency To Test Design, Examinee Ability And Item Difficulty In Computer-Based Test Administration*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL.

Van Fan, Y., Clyman, S.G. & Luecht, R.M. (1997, April). *The Applicability Of Conjoint Analysis For Performance-Based Assessments*. Paper presented at the Annual Meeting of the National Council on Measurement in Education.

Becker, D.F., Gessaroli, M.E., Luecht, R.M. & Folske, J.C. (1996, June). *Developing and implementing user-based scales and norms for clinical clerkship examinations.* Presented at the 7th Ottawa International Conference on Medical Educaton and Assessment, Maastricht, The Netherlands.

Clauser, B.E., Ross, L.P., Luecht, R.M., Nungester, R.J. & Clyman, S.G. (1996, June). *Using the Rasch Model to equate alternate forms for performance assessments of physician's clinical skills*. Presented at The 7th Ottawa International Conference on Medical Education and Assessment, Maastricht, The Netherlands.

Folske, J.C., Luecht, R.M., Subhiyah, R.G. & Becker, D.F. (1996, April). *A comparison of applied prediction models in a pass/fail licensure context.* Presented at the Annual Meeting of the National Council on Measurement in Education. New York, NY.

Gessaroli, M.E., Folske, J.C., Luecht, R.M. & Becker, D.F. (1996, June). *Scores and norms for basic science course and clinical science clerkship examinations.* Presented at the 7th Ottawa International Conference on Medical Education and Assessment, Maastricht, The Netherlands.

Iwamoto, C.K., Nungester, R.J. & Luecht, R.M. (1996, April). *Power of similarity methods and person fit analysis to detect copying behavior.* Presented at the Annual Meeting of the American Educational Research Association, New York, NY.

Luecht, R.M. (1996, October). Computer-adaptive sequential testing (CAST): a philosophy and implementation framework for efficient computerized testing. **Invited paper** presented at the *Large-Scale Testing Programs in the Northeast: Research Agendas for the 21st Century Symposium* at the Northeastern Educational Research Association, Ellenville, NY.

Luecht, R.M. (1996, March). *The practical utility of Rasch measurement models.* **Invited paper** presented at the Issues in Computer Adaptive Testing for Assessing Reading Proficiency Conference, University of Minnesota Center for Advanced Research on Language Acquisition, Minneapolis.

Luecht, R.M., Clauser, B.E. & Nungester, R.J. (1996, June). *Issues Of Efficiency For Adaptively Administered Computerized Case Simulations.* Presented at The 7th Ottawa International Conference on Medical Education and Assessment, Maastricht, The Netherlands.

Luecht, R.M., Nungester R.J. & Hadadi, A. (1996, April). *Heuristic-Based Cat: Balancing Item Formation, Content And Exposure.* Presented at the Annual Meeting of the National Council on Measurement in Education, New York.

Folske, J.C., Iwamoto, C.K., Nungester, & R.J., Luecht, R.M. (April, 1995). *Using the Rasch model to investigate the feasibility of producing model-based norms for the NBME Subject Examinations.* Paper presented at the Annual Meeting of the American Education Research Association, San Francisco, CA.

Iwamoto, C.K. , Nungester, R., & Luecht, R.M. (1995, April). *A study of statistical methods to detect similarity of responses.* Paper presented at the Annual Meeting of the American Education Research Association, San Francisco, CA.

Luecht, R.M. (1995, April). *Some technical insights into response-based standard setting for dichotomous and polytomous models*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, San Francisco, CA.

Luecht, R.M. (1995, June). *A conceptual twist on the parameterization of IRT models*. Paper presented at the annual meeting of the Psychometric Society, Minneapolis, MN.

Luecht, R.M. (1995, October). *Some critical issues in computerized adaptive testing.* Paper presented at the Research in Medical Education Conference/Annual Meeting of the American Association of Medical Colleges, Washington, D.C.

Luecht, R M. (1994, December). *A generalized heuristic for automated test assembly with problem-linked items*. **Invited paper** presented at the Social Science Information Technology Conference, Amsterdam, The Netherlands.

Luecht, R.M. (1994, April). *A demonstration of an interactive computer program to perform a DIF analysis polytomous item response data*. Paper & demonstration software presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

Luecht, R.M. (1994, December). *Software Programs For Teaching About IRT And Computerized Adaptive Testing*. **Invited** address at the University of Amsterdam, The Netherlands.

Miller, T.R., Luecht, R.M. & Welch, C.J. (1994, April). *Extracting Collateral Information To Improve Conditioning In Performance Assessment DIF Analysis*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

Thompson, T. & Luecht, R.M. (June, 1994). *Calibrating Operational Test Forms Containing Pretest Items*. Paper presented at the Annual Meeting of the Psychometric Society, Champaign, Illinois.

van der Linden, W.J. & Luecht, R.M. (1994, April). *An Optimization Model For Test Assembly To Match Observed-Score Distributions*. Symposium paper presented at the Annual Meeting of the American Education Research Association, San Francisco, CA.

Luecht, R.M. (1993, April). *A marginal maximum likelihood approach to deriving multidimensional composite abilities under the generalized partial credit model*. Paper presented at the Annual Meeting of the American Educational Research Association, Atlanta, GA.

Luecht, R.M. (1993, April). *Using IRT to improve the standard setting process for dichotomous and polytomous items*. Paper presented at the Annual Meetings of the American Educational Research Association and the National Council on Measurement in Education (joint), Atlanta, GA. Also **invited paper** at the CCSSO Conference, Albuquerque, NM, June, 1993.

Luecht, R.M. (1993, April). *Some results on the stability of the NAEP achievement level standards in mathematics*. Paper presented at the Annual Meetings of the American Educational Research Association and the National Council on Measurement in Education (joint), Atlanta, GA. Also **invited paper** at the CCSSO Conference, Albuquerque, NM, June, 1993.

Luecht, R.M. (1993, November). *Scaling Holistically-Scored Performance Assessments: Composites Or Compost*. **Invited** address at the University of California-Santa Barbara, Graduate School of Education, Santa Barbara, CA.

Luecht, R.M. & van der Linden, W.J. (1993, June). *Generating Target Test Information And Characteristic Functions To Match Observed Score Distributions*. Paper presented at the 1993 Annual Meeting of the Psychometric Society, Berkeley, CA.

van der Linden, W.J. & Luecht, R.M. (1993, June). *Optimization Models For Test Assembly To Match Observed-Score Distributions*. Paper presented at the 1993 Annual Meeting of the Psychometric Society, Berkeley, CA.

Luecht, R.M. (1992, April). *Generating target information functions and item specifications in test design*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, San Francisco, CA.

Luecht, R.M. & Miller, T.M. (1992, April). *Considerations Of Multidimensionality In Polytomous Item Response Models*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Luecht, R.M. & Hirsch, T.M. (1991, June). *Computerized Test Construction Of Parallel Forms With Problem-Linked Items*. Paper presented at the Annual Meeting of the Psychometric Society, New Brunswick, NJ.

Luecht, R.M. & Miller, T.R. (1991, April). *Unidimensional Calibrations And Interpretations Of Multidimensional Tests*. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Chicago, IL.

Luecht, R.M. & Hirsch, T.M. (1990, June). *Item Selection Via An Average Growth Approximation Of Target Information Function*. Paper presented at the Annual Meeting of the Psychometric Society, Princeton, NJ.

Luecht, R.M. & Smith, P.L. (1990, April). *Variance Component Estimation With Unbalanced Data*. Paper presented at the Annual Meeting of the American Educational Research Association, Boston, MA.

Smith, P.L. & Luecht, R.M. (1990, April). *Statistical Issues in Generalizability Theory*. Paper presented at the Annual Meeting of the American Educational Research Association, Boston, MA.

Luecht, R.M., Madsen, M.K., Taugher, M.P., Coffey, F. & Petterson, B. (1989, May). *Assessing Professional Perceptions: Design And Validation Of An Interdisciplinary Education Perception Scale*. Poster presentation at the 11th Annual Allied Health Research Forum, University of Illinois at Chicago, College of Associated Health Professions.

Luecht, R.M., Madsen, M.K. & Sander, E. (1989, May). *A Multidimensional Model For Computer Training Of Allied Health Faculty*. Paper presented at the 11th Annual Allied Health Research Forum, University of Illinois at Chicago, College of Associated Health Professions.

Luecht, R.M. & Smith, P.L. (1989, April)*. The Effects Of Bootstrapping Strategies On The Estimation Of Variance Components*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

Coffey, F., Petterson, B.J., Luecht, R.M., Taugher, M. P. Gresch, A.M. & Madsen, M.K. (1988, May). *Interprofessional perception in an interdisciplinary rehabilitation clinic using the IPS*. Poster presentation at the University of Illinois Medical College Research Forum, Chicago.

Luecht, R.M., Madsen, M.K. & Sander, E. (1988, May). *A Model For Computer Training Of Allied Health Professionals*. Panel forum and paper presented at the First World Congress on Allied Health, Elsinore, Denmark.

Luecht, R.M. & Pecyna, P.M. (1988, March). *MS-TTR: A Computation Algorithm For Standardizing Type/Token Ratios*. Paper presented at the American Speech- Language-Hearing Association, Boston.

Petterson, B.J., Coffey, F., Madsen, M.K., Luecht, R.M., Taugher, M.P. & Gresch, A.M. (1988, May). *Interprofessional Perception In An Interdisciplinary Rehabilitation Clinic Using The IPS*. Paper presented at the 21st Conference of the American Society of Allied Health Professions, New Orleans.

Smith, P.L., Luecht, R.M. & Anderson, A.J. (1988, April). *Bootstrapping Variance Component Estimates*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.

D. TEACHING AND WORKSHOPS AND OTHER PRESENTATIONS

<u>Courses Taught at the University of North Carolina at Greensboro (1999-present)</u>

ERM-617 Statistical Methods in Education
ERM-667 Foundations of Educational Measurement
ERM-668 Survey Research Methods in Education
ERM-669 Item Response Theory
ERM-680 Intermediate Statistical Methods in Education
ERM-681 Design and Analysis of Educational Experiments
ERM-675 Data Presentation and Reporting in Education (course designer, too)
ERM-726 Seminar in Advanced Topics in Measurement (Equating, Performance
                 Assessments, Standard Setting, Assessment Engineering)
ERM-727 Computer-Based Testing: Methods and Applications (course designer, too)
ERM-728 Factor Analysis and Multidimensional Scaling
EMR-729 Advanced Item Response Theory (course designer, too)
ERM-731 Structural Equation Modeling
ERM-734 Test Equating

<u>Workshops</u>

Item Writing in the Sciences. University of North Carolina at Greensboro. Guilford County Genomic Medicine Project, November, 2005.

Assessment and Achievement. University of North Carolina Summer Institute. With Terry Ackerman. June, 2001.

Assessment and Achievement. University of North Carolina Summer Institute. With Terry Ackerman. May, 2000.

Introduction to Item Response Theory. **Invited** workshop presented at the Research in Medical Education Conference/Annual Meeting of the American Association of Medical Colleges, Washington, D.C., with Raja Suhiyah, and Lynn Webb, L., October, 1995.

Managing Item Pools, Item Exposure And Test Content Constraints In A Computerized Adaptive Test. **Invited** workshop/colloquium at the University of Delaware, Dept. of Education, Newark, DE, October, 1995.

Computerized Adaptive Testing: Philosophical Issues And Practical Applications. Invited training course at the Annual Meeting of the National Council on Measurement in Education, San Francisco, CA, with Mark Reckase, April, 1992.

Computerized Adaptive Testing: Philosophical Issues And Practical Applications. Invited training session for the Annual Meeting of the National Council on Measurement in Education, Chicago, IL, , with Mark Reckase, April, 1992..

An Introduction To Medical Records Data Management Systems. **Invited** workshop for hospital administrators and medical records administrators sponsored the University of Wisconsin-Milwaukee, May, 1988.

A Data Base Management Systems In Health Care. **Invited** workshop for medical records administrators sponsored the University of Wisconsin-Milwaukee, 1987.

E. SELECTED COMPUTER SOFTWARE TITLES (WRITTEN BY R. LUECHT)

[Note: Unless otherwise noted, the software listed below was written for personal computers (PCs using DOS and/or Windows operating systems). Many of these programs are still used operationally at various universities and some of the major testing organizations. Not all are simple programs; the term "system" generally refers to an integrated set of software programs (e.g. data entry, data base management, analysis and reporting modules). All of the software included documentation and featured user-friendly interfaces. Approximately 200 additional software titles of research, simulation and data management utility programs are not listed here.]

Luecht, R.M. (1985). *FINNHELP*. [Computer program]. Mainframe statistical utility program for setting up Multivariance IV (Finn, 1979) analyses control cards and contrast matrices. University of Wisconsin-Milwaukee.

Luecht, R.M. (1985). *STATMAN*. [Computer program]. Graphically-based statistical tutorial and analysis software program for introductory statistics courses. University of Wisconsin Milwaukee.

Luecht, R.M. (1986). *TAXON*. [Computer program]. PC utility software program for generating optimal test specifications per Bloom's taxonomy, learning objective and other test features. University of Wisconsin Milwaukee.

Luecht, R.M. (1986). *TESTPAC*. [Computer program]. Computer-based classical item analysis and scoring software system for educational. Released as public domain software in 1987. Version 2.0 (c) 1989 released in 1989. University of Wisconsin Milwaukee.

Luecht, R.M. (1987). *EPI-D*. [Computer program]. PC-based statistical and epidemiological analysis software system. University of Wisconsin Milwaukee.

Luecht, R.M. (1987-9). *CompWISE*(tm) and *InformationWISE*(tm). [Computer programs]. Integrated salary administration and analysis software, copyright assigned 1987, 1988, 1989 to James and Scott Associates, Inc., Milwaukee, WI.

Luecht, R.M. (1987-9). *ATTEST*. [Computer programs]. Integrated hospital records management utility program for creating physician attestation real-time reports. Copyright assigned 1989 to St. Mary's Hospital, Milwaukee, WI.

Luecht, R.M. (1988). *READER-X*. [Computer program]. Experimental reading and cognitive research software system. University of Wisconsin Milwaukee.

Luecht, R. M. (1989). *RATINGS*. [Computer program]. Data entry and classical item analysis and scoring software system for polytomous rating scores. Integrated as part of the merit

system for faculty evaluations. University of Milwaukee-Wisconsin, School of Allied Health. (Still in use at UWM)

Luecht, R.M. (1990). *IRT*. [Computer program]. Psychometric utility software program for calculating and graphing item response theory item and test information and characteristic functions. Iowa City, IA: ACT.

Luecht, R.M. (1990, 1991). *ITEMSTAT* (Versions 1.0 & 1.1). [Computer program]. PC program for classical and item response theory item analysis and examinee scoring of large sample data (uses marginal maximum likelihood). Also produces expected observed scores from IRT item statistics, based on the Lord-Wingersky recursion algorithm. Iowa City, IA: ACT.

Luecht, R.M. (1990). *ISEL*. [Computer program]. Integrated test construction software system using IRT information functions and algorithms developed by Luecht and Hirsch (1990). Iowa City, IA: ACT.

Luecht, R.M. (1990). *ESTI3PL*. [Computer program]. 3-parameter IRT item calibration and scaling software program for small samples, employing maximum marginal a posteriori estimation. Iowa City, IA: ACT.

Luecht, R.M. (1990). *MCATSets*. [Computer program]. Data base and file management system for the Medical School Admissions Test pretest calibration project. Iowa City, IA: ACT.

Luecht, R. M. (1991). *VECTOR-2D*. [Computer program]. Two-dimensional item vector graphing program for multidimensional IRT applications. Iowa City, IA: ACT.

Luecht, R.M. (1991, 1994). *IRTSTAT*. (Versions 1.0 and 2.0). [Computer program]. Utility software program for IRT parameter scaling and computing classical item/test statistics from IRT parameter estimates. Iowa City, IA: ACT.

Luecht, R. M. (1992). *NAEP-DE*. [Computer program]. Complete data entry software system for the National Assessment of Educational Progress (NAEP) Achievement Levels Standard Setting Project. Iowa City, IA: ACT.

Luecht, R. M. (1992). *NAEP-STDS*. [Computer program]. IRT computational software program for integrated, multiple item pool, multiple judge (many-to-many) mappings of Angoff ratings to a calibrated proficiency scale via the weighted TCC method. Software was developed as part of the National Assessment of Educational Progress (NAEP) Achievement Levels Standard Setting Project. Iowa City, IA: ACT.

Luecht, R. M. (1992). *NAEP-RPT*. [Computer program]. On-site reporting and graphing software system for standard setting. Provided extensive judge- and item-based feedback reports for Angoff ratings in a network environment. Developed as part of the National Assessment of Educational Progress (NAEP) Achievement Levels Standard Setting Project. Iowa City, IA: ACT.

Luecht, R. M. (1992). *VECTOR-3D*. Three-dimensional item vector graphing and rotation program for multidimensional IRT applications. Iowa City, IA: ACT.

Luecht, R. M. (1992). *2D-EAP*. [Computer program]. Bayesian estimation software program for computing two-dimensional expected a posteriori IRT proficiency scores, based on the multidimensional three-parameter normal ogive model. Iowa City, IA: ACT.

Luecht, R. M. (1992). *CATExam*. [Computer program]. Interactive computerized adaptive testing demonstration software system based on the 3PL model. Fully functional as a CAT. User-provided test item text and data can be imported to the program. Iowa City, IA: ACT.

Luecht, R.M. (1993, 1994). *POLYMML*. [Computer program]. Marginal maximum likelihood item calibration and ability estimation program for calibrating polytomous data under a multidimensional extension of the generalized partial credit model (Muraki, 1992). Based on work described by Luecht (1993) for scaling performance assessments via the GPCM, using collateral information. Iowa City, IA: ACT.

Luecht, R.M. (1993). *ITEMSEL*. [Computer program]. DOS-based automated test assembly software system using classical item statistics and test functions and allowing multiple dimensions for the content constraints. Iowa City, IA: ACT.

Luecht, R.M. (1993). *Pic&Chuz*. [Computer program]. DOS-based automated test assembly software system using IRT test information functions and test characteristic functions, with multiple dimensions of content constraints. Developed for the National Council on Evaluation in Engineering and Surveying project. Iowa City, IA: ACT.

Luecht, R.M. (1993). *LSAT* ATA software series. [Computer program]. Automated large scale test assembly software for IRT test construction problems involving passage based test units and multiple content constraints. Copyright assignment joint to American College Testing and the Law School Admissions Council. Iowa City, IA: ACT.

Luecht, R. M. (1994). *Builder* 2.0, 3.0, 4.0. [Computer program]. Automated test assembly software program for use with classical test statistics and multiple content and item attribute dimensions. . Iowa City, IA: ACT. Customized version modified for the National Board of Medical Examiners.

Luecht, R. M. (1994). *Manager*. [Computer program]. Automated test assembly software data management and interactive item selection utility program for use in conjunction with BUILDER (Luecht, 1994). Iowa City, IA: ACT. Customized version modified for the National Board of Medical Examiners.

Luecht, R. M. (1994). *POOLANAL*. [Computer program]. Item pool analysis utility program for use in conjunction with BUILDER (Luecht, 1994). Iowa City, IA: ACT. Customized version modified for the National Board of Medical Examiners.

Luecht, R. M. (1994). *LOGMOMENT*. [Computer program]. Software to compute expected observed scores from logistic or normal IRT models, using the compound binomial recursion formula.

Luecht, R. M. (1994). *DOBIGSTEPS*. [Computer program]. Rasch equating analysis DBMS software. Proprietary NBME software. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. (1994, 1995). *EQUATE1PL*. [Computer program]. Interactive equating software for the Rasch model. Also incorporates optimization heuristics for automatically selecting anchor items. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. (1994, 1995, 1996). *SCORE2MLE*. [Computer program]. Unconditional Rasch model maximum likelihood estimation software program and DBMS. This program is the core scoring engine used for approximately 100,000 NBME Subject Test administrations each year. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. (1994). *CATDEMO.* [Computer program]. Interactive computerized adaptive testing tutorial and demonstration software. Includes item-level performance graphics and is fully functional as a low-security adaptive testing software driver for single users. Currently used by several graduate programs in measurement to teach about CAT. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. (1995). *STDSET*. [Computer program]. Data entry, scaling and analysis system for mapping Angoff ratings to an IRT scale. Includes extensive judge- and item-based reporting options. Uses "information weighting" to produce robust estimates of a standard. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. (1995). *TRUEQUATE*. [Computer program]. Empirical linear equating software via the test characteristic method. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. (1996). *TOOLKIT*. [Computer program]. Windows™-based automated test assembly software for use with classical test statistics. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. (1996). IMPCONT1. [Computer program]. DBMS conversion utility for preparing data files for the commerical ATA software, CONTEST 1.0 (Timminga, van der Linden & Schweitzer, 1996). Shareware.

Luecht, R. M. (1997). *MLESCORE*. [Computer program]. Maximum likelihood scoring program for computerized adaptive testing. Used operationally at the NBME. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. (1997). *ITEMMLE*. [Computer program]. Item analysis and fit detection program, based on conditional maximum likelihood scores. For performing IRT-based item analysis in a computerized adaptive testing environment. Used operationally at the NBME. Philadelphia, PA: National Board of Medical Examiners.

Luecht, R. M. & Hadadi, A. (1998). *ATA ENGINE*. [Computer program]. Large scale, core operational NBME software for automated test assembly. Based on an object-oriented implementation of the NWADH heuristic. Proprietary NBME software.

Luecht, R. M. (1996, 1999, 2003). *CASTISEL*. [Computer program]. 1PL and 3PL automated test assembly for computer-adaptive multistage tests (ca-MST and CAST). Uses multiple, simultaneous objective functions and constraint sets. Released as freeware in 1999, 3PL version. (Version 1.5 release in 2003.)

Luecht, R. M. (2001, 2002). *ITEMANALYSIS 1.0.* [Computer program]. Interactive item analysis for multiple-choice (MC) and partial-credit (PC) classical test item analysis. Complete MC distractor and PC "scoring expression" analysis.

Luecht, R. M. (2001). *X-ScoreWS 1.0.* [Computer program]. Computes observed scores and classical item statistics from Rasch item parameters and moments of the ability distribution. Works for multiple-choice (MC) and partial-credit (PC) item files. Determines number-correct cut scores for a designated test form at a fixed ability level.

Luecht, R. M. (2001). *ATA COMBINATOR 1.0.* [Computer program]. Computes complete combinatoric item selection solutions for problem-linked item sets, using the normalized weighted absolute deviation (NWAD, Luecht, 1998) heuristic. Outputs are "optionalized" by a reliability criteria. Uses classical test objective functions and allows item-level constraints.

Luecht, R. M. (2004). *Score3PL-EAPMLE*. [Computer program]. Computes IRT expected a posterior (EAP) score estimates and maximum likelihood score estimates score for the 3PL logistic model.

Luecht, R. M. (2005). MIRTGEN2. [Computer program]. Computes dichotomous response data from a multidimensional 3PL IRT model, with up to 10 correlated dimensions.

Luecht, R. M. (2005, 2009). *CITAN: Classical Item Analysis* (Version 1.5). [Computer program]. Computes classical item analysis statistics and distractor analysis.

Luecht, R. M. (2012). *Quik-TRA: Quick Test and Reliability Analysis* (Version 1.0). [Computer program]. Computes classical item analyses and test scale reliability analyses using drag-and-drop interface simplicity.

Luecht, R. M. (2012). *Quik-SCORE: Quick Item Scorig* (Version 1.0). [Computer program]. Scores raw response data for use with Quik-TRA.

Luecht, R. M. (2013). *Build_caMST_Panels_TIF-NWADH* (Version 1.0). [Computer program]. Automated test assembly for ca-MST modules and panels based on Luecht's NWAD heuristic.

Luecht, R. M. (2013). ObsScorStats_IRT (Version 1.0). [Computer program]. Software to compute expected observed score distributions from logistic or normal IRT models, using the compound binomial recursion formula, including conditional distributions.

Luecht, R.M. & Spray, J.S. (1991). *DIF*. Analysis software for detecting differential item functioning using Mantel-Hanzel log-odds ratios.

Luecht, R.M. & Spray, J.S. (1993). *VISDIF*. Graphic analysis software for detecting differential item functioning using logistic discriminant function analysis.