Prof. Ruby Hanson

Department of Chemistry Education
University of Education, Winneba

ORCID 0000-0002-2964-0197 · Homepage uew.edu.gh/dce/staff/rhanson · Google Scholar scholar.google.com/citations?user=4ygnj5sAAAAJ&hl=en · Profile uew.peerford.com/staff/361002b2-87e3-43be-8168-eb9ed5eb6004

PROFILE

Ruby Hanson's researches have focused on finding out students' conceptual challenges and remediating them through innovative and interactive strategies, development of e-courseware, the use of micro science equipment for conceptual labs, and the preparation of science teacher trainees for teaching in contemporary times. Her recent projects focus on STEM, sustainability and systems thinking. She holds annual chemistry fairs for young learners to start them right in their study of chemistry with grants from the American Chemical Society.

She is Dean of the Faculty of Science Education and a full Professor of Chemistry Education, in the University of Education, Winneba- the leading teacher education institute in Sub-Saharan Africa.

Professor Hanson obtained her Ph.D (Chemistry Education) from the University of Education. She holds an M.Phil (Analytical and Environmental Chemistry) from the University of Cape Coast, where she carried out research in chemical toxicology in aquatic animals. She also holds a Certificate degree in Designing & Facilitating E-Learning from the Open Polytechnic of New Zealand, as well as certificates from the Utrecht and Vrije Universiteit in Development and Research in Science and Mathematics Education. She headed a Science Team that spearheaded a revolutionary national curriculum in the teaching and learning of science. She is a member of the IUPAC-Systems Thinking in Chemistry for Sustainability International Working Group.

Professor Hanson is a recipient of a District Best Teacher Award as well as many other awards at both local and international conferences and workshops.

Prof. Ruby Hanson

Email: rhanson@uew.edu.gh, maameruby@yahoo.com

Homepage: http://uew.edu.gh/staff/ruby-hanson

Publications: publications.uew.edu.gh/2015

RESEARCH

Interests	Micro/Green Chemistry Education · Mitigation of Humanitarian Challenges · STEM · Sustainability · Gender
Areas	Education · Developmental and Educational Psychology · Physical and Theoretical Chemistry · Information Systems · Computer Science Applications · Environmental Chemistry

RESEARCH SUMMARY

89	509	13	17	1.00	14%
Publications	Citations	h-index	i10-index	Field-weighted impact	World top 10%

Counted from the 89 publications listed below, 2007–2026. Field-weighted impact is the mean over the 42 works scored for it; 1.00 is the world average for works of the same field, type and year. 6 of the 42 papers scored for it are among the world's most cited tenth for their field, type and year.

POSITIONS

Dean of Faculty of Science; Full Professor; and Researcher 2005–present
Department of Chemistry Education, University of Education Winneba, Winneba, Ghana

EDUCATION AND QUALIFICATIONS

PhD; Doctor; Professor 2005–present
Department of Chemistry Education, University of Education Winneba, Winneba, Ghana

DISTINCTIONS, MEMBERSHIPS AND SERVICE

South Africa Chemical Institute
Pretoria, South Africa

University of Warwick
Warwick, United Kingdom

International Conference of Chemistry Education
Cape Town, South Africa

American Chemical Society
Washington, United States

International Union of Pure and Applied Chemistry
Durham, United States

International Network of Women in Engineering and Science
Winneba, Ghana

PUBLICATIONS

Journal articles 78

1. Esther Nartey, **Ruby Hanson** (2026). Leveraging indigenous materials for chemistry education: The use of improvised ball-and-stick models in teaching hydrocarbons. *African Journal of Chemical Education*. https://www.ajol.info/index.php/ajce/article/view/334034/313815
2. **Ruby Hanson**, Charity E. Anor (2025). Engaging pre-service teachers in an indigenous activity to investigate sustainability and green practices in palm oil production. *Physical Sciences Reviews*. https://doi.org/10.1515/psr-2023-0053
3. Esther Nartey, Ernest Koranteng, Emmanuel Kyame Oppong, **Ruby Hanson** (2024). Analysis of undergraduate chemistry students' responses to substitution reaction mechanisms: a road to mastery. *Chemistry Teacher International*. https://doi.org/10.1515/cti-2023-0075
4. Kwarteng Twumasi, B Yaayin, **R Hanson** (2024). Effect of Computer Animation on Senior High School Students' Academic Achievement in Rate of Reactions. *Open Access Library Journal*. https://www.researchgate.net/profile/Boniface-Yaayin-2/publication/385879122_Effect_of_Computer_Animations_on_Senior_High_School_Students'_Academic_Achievements_in_Rate_of_Reactions/links/6738905068de5e5a307830b0/Effect-of-Computer-Animations-on-Senior-High-School-Students-Academic-Achievements-in-Rate-of-Reactions.pdf
5. Gloria Asiedu, Boniface Yaayin, **Ruby Hanson** (2024). Effect of Computer Animations on Senior High School Students' Academic Achievements in Rate of Reactions. *OALib*. https://doi.org/10.4236/oalib.1112276
6. Emmanuel Nanor, Alhassan Mahama, **Ruby Hanson** (2024). Effect of Stad Model of Cooperative Learning on Students' Learning Outcome on Nomenclature of Hydrocarbon. *International Journal of Scientific Research and Management (IJSRM)*. https://doi.org/10.18535/ijsrm/v12i03.el03
7. Kwarteng Twumasi, Afia Sakyiwaa Amponsah, Kwarteng Twumasi Ankrah, Francis Acquah, Hubert Amu, Richard Osei Agjei, **Ruby Hanson** (2024). Health Risk Assessment of Heavy Metals in Lettuce and Spring Onion on Human Health in Kumasi, Ghana. *Environmental Health Insights*. https://doi.org/10.1177/11786302241285737
8. Lieke Stoffelsma, Victor Antwi, **Ruby Hanson** (2024). Incidental Vocabulary Learning in a Postcolonial English Second Language Context. *Language Matters*. https://doi.org/10.1080/10228195.2024.2341010

9. Kwarteng Twumasi, E Nartey, A Sam, **R Hanson** (2023). Chemistry students' knowledge and practices of chemical waste management in chemistry laboratories. *African Journal of Chemical Education*. https://www.ajol.info/index.php/ajce/article/view/251868

10. **Ruby Hanson**, Charles Hanson (2023). Exploring the Possibility of Embedded Sustainability and Humanitarian Principles into Chemical Studies from a Systems Thinking Approach. *International Journal for Cross-Disciplinary Subjects in Education*. https://doi.org/10.20533/ijcdse.2042.6364.2023.0591

11. **R Hanson** (2023). STUDENTS'PERCEPTIONS OF A STEM-BASED CURRICULUM: A PHENOMENOGRAPHIC APPROACH. *African Journal of Chemical Education AJCE*. https://www.researchgate.net/profile/Ruby-Hanson-3/publication/373485721_STUDENTS'_PERCEPTIONS_OF_A_STEM-BASED_CURRICULUM_A_PHENOMENOGRAPHIC_APPROACH/links/64ee6309e90b104cea220212/STUDENTS-PERCEPTIONS-OF-A-STEM-BASED-CURRICULUM-A-PHENOMENOGRAPHIC-APPROACH.pdf

12. David Tsitu Agbeko, John Yale, **Ruby Hanson** (2023). Science Tutors' Knowledge of Differentiated Instruction in Colleges of Education in Volta Region, Ghana. *Journal for Research in Applied Sciences and Biotechnology*. https://doi.org/10.55544/jrasb.2.1.16

13. George Agbenyega Nyagblormase, Boniface Yaayin, **Ruby Hanson** (2023). The Effectiveness of Flipped Classroom in Improving Pre-service Science Teachers' Performance in Kinetic Molecular Theory of Matter. *International Journal of Innovative Research and Development*. https://doi.org/10.24940/ijird/2023/v12/i6/jun23022

14. Gadafi Iddrisu Balali, **R Hanson**, B Yaayin (2023). Using exemplary materials to enhance students' performance and retention in hybridization. *African Journal of Chemical Education—AJCE*. https://www.researchgate.net/profile/Gadafi-Iddrisu-Balali-2/publication/372858906_Using_Exemplary_Materials_to_Enhance_Students'_Performance_and_Retention_in_Hybridization/links/64cb204b91fb036ba6bfcb03/Using-Exemplary-Materials-to-Enhance-Students-Performance-and-Retention-in-Hybridization.pdf

15. **R Hanson** (2022). Adopting sustainable micro chemistry activities for conceptual and financial benefits. *African Journal of Chemical Education*. https://www.ajol.info/index.php/ajce/article/download/221312/208838

16. Claudia Quayson, Kwarteng Twumasi Ankrah, Ernest Koranteng, **Ruby Hanson** (2022). Chemistry Teacher Trainees' use of Molecular Models in Learning Spiro and Bicyclic Compounds. *Science education international*. https://doi.org/10.33828/sei.v33.i3.4

17. Boniface Yaayin, Emmanuel K. Oppong, **Ruby Hanson** (2022). ENHANCING PRE-SERVICE TEACHERS' UNDERSTANDING AND ATTITUDES TOWARD NAMING AND REACTIONS OF ORGANIC COMPOUNDS USING JIGSAW APPROACH. *European Journal of Open Education and E-learning Studies*. https://doi.org/10.46827/ejoe.v7i2.4442

18. Nelly Sakyi–Hagan, **Ruby Hanson** (2022). Gender differences in Performance in Integrated Science among Pre-Service Science Teachers: A Case of a University in Ghana. *EAST AFRICAN JOURNAL OF EDUCATION AND SOCIAL SCIENCES*. https://doi.org/10.46606/eajess2022v03i06.0231

19. **Ruby Hanson** (2022). Integrating the Natural and Social Sciences in a Ghanaian University: An Idea for Curriculum Orientation. *International Journal for Infonomics*. https://doi.org/10.20533/iji.1742.4712.2022.0217

20. Charity Esenam Anor, Jan Lundell, **Ruby Hanson**, Emmanuel Oppong (2022). Students' engagement in learning by indigenous knowledge-chemistry lesson. *LUMAT International Journal on Math Science and Technology Education*. https://doi.org/10.31129/lumat.10.1.1715

21. Francis Adjei, **Ruby Hanson**, Arkoful Sam, Samuel Sedegah (2022). The use of Collaborative Approaches on Students' Performances in Redox Reactions. *Science education international*. https://doi.org/10.33828/sei.v33.i2.4

22. Boniface Yaayin, Emmanuel K. Oppong, **Ruby Hanson** (2021). Efficacy of Jigsaw Model in Improving Pre-Service Teachers' Performance in Selected Functional Group Organics Compounds. *DOAJ (DOAJ: Directory of Open Access Journals)*. https://doi.org/10.33828/sei.v32.i3.2

23. **Ruby Hanson** (2021). Employing Microscience Equipment to Promote Chemistry Education Through Constructivist Hands- and Minds-on Activities. *Interchange*. https://doi.org/10.1007/s10780-021-09422-8

24. Esther Nartey, **Ruby Hanson** (2021). The The perceptions of Senior High School students and teachers about organic chemistry: A Ghanaian perspective. *Science education international*. https://doi.org/10.33828/sei.v32.i4.8

25. Esther Nartey, **Ruby Hanson** (2021). The differential perceptions of selected Ghanaian Senior High School (SHS) students and teachers about organic chemistry. *African Journal of Chemical Education*. https://scholar.google.com/scholar?cluster=5045199667813901 95&hl=en&oi=scholarr

26. **Ruby Hanson** (2020). Designing E-content for teaching basic analytical chemistry in higher education: A baseline study. *Science education international*. https://doi.org/10.33828/sei.v31.i1.3

27. **Ruby Hanson**, Cunshan Zhou, Arun Mujumdar, Richard Osae, Abdullateef Taiye Mustapha, Hafida Wahia, Gilbert Sampson, Abigail Amoa-Owusu, Haile Ma (2020). Effect of simultaneous dual-frequency ultrasound aided ethanolic pretreatment on drying kinetics, bioactive compounds, antioxidant activity, and physicochemical properties of apple slices using pulsed vacuum dryer. *Journal of Food Process Engineering*. https://doi.org/10.1111/jfpe.13535

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29. **Ruby Hanson** (2020). How Gender-friendly Constructivist Approaches Facilitate the Development of STEM Skills. *International Journal for Cross-Disciplinary Subjects in Education*. https://doi.org/10.20533/ijcdse.2042.6364.2020.0523

30. **Ruby Hanson**, Jacqueline Nkrumah (2020). Implications of self-medication in pregnancy for Safe Motherhood and Sustainable Development Goal-3 in selected Ghanaian communities. *Public Health in Practice*. https://doi.org/10.1016/j.puhip.2020.100017

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34. Kaburi, Raymond Achengkwoa, Feifei TaoSir, Agboifo Edmond Omenonye, **Hanson, Ruby**, Yan, Lan (2019). Effectiveness of Integrating Hands-On Activities In The Learning of Chemical Bonding in High-School Setting. *Zenodo (CERN European Organization for Nuclear Research)*. https://doi.org/10.5281/zenodo.3588654

35. Boi Doku Anyetei, Twumasi Ankrah Kwarteng, **Ruby Hanson** (2019). Interpretation of inclusive education practices in science at a basic school. *African Journal of Educational Studies in Mathematics and Sciences*. https://doi.org/10.4314/ajesms.v15i1.2

36. G Safo-Adu, **R Hanson** (2019). Practices and knowledge about environmental sanitation and hygiene among urban dwellers in Gomoa East District, Ghana. *European Journal of Earth and Environment Vol*. http://www.idpublications.org/wp-content/uploads/2019/01/Full-Paper-PRACTICES-AND-KNOWLEDGE-ABOUT-ENVIRONMENTAL-SANITATION-AND-HYGIENE.pdf

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38. **Ruby Hanson**, Emmanuel Kutorglo (2019). The Use Of A Digital Learning System For Developing Pedagogical Skills: Ideas For Research-Based Practice. *Journal of Information Technologies and Lifelong Learning*. https://doi.org/10.20533/jitll.2633.7681.2019.0014

39. **Ruby Hanson**, Nelly Sakyi-Hagan (2019). Understanding Teacher Trainees' Reasoning Patterns about the Formation and Description of Chemical Compounds. *Science education international*. https://doi.org/10.33828/sei.v30.i2.4

40. **Ruby Hanson**, Arkoful Sam (2019). Unearthing pre-tertiary students' reasoning patterns about elements, mixtures and compounds. *tralian Journal of cation in Chemistry*. https://www.researchgate.net/profile/Arkoful-Sam/publication/337622913_Unearthing_pre-tertiary_students'_reasoning_patterns_about_elementsmixtures_and_compounds/links/5de0ef0ba6fdcc2837f43d44/Unearthing-pre-tertiary-students-reasoning-patterns-about-elementsmixtures-and-compounds.pdf#page=4

41. **Ruby Hanson** (2019). Using Activity Worksheets to Remediate Pre-Service Teachers' Alternative Conceptions about Word Equations. *The Canadian Journal of Action Research*. https://doi.org/10.33524/cjar.v20i2.398

42. **R Hanson** (2018). Assessing conceptual change instruction accompanied with concept maps and analogies: A case of acid-base strengths. *Journal of Turkish Science Education*. https://mail.tused.org/index.php/tused/article/view/249

43. **R Hanson** (2018). Assessment of hands-on activities on students' achievement and attitudes towards chemical bonding. *International Journal of Innovative Research and Development*. https://www.academia.edu/download/101488009/89247.pdf

44. **Ruby Hanson** (2018). Effects of sequenced experimentation on trainees understanding of concepts in analytical chemistry. *African Journal of Educational Studies in Mathematics and Sciences*.

45. Joyce Nsiah Asante, **Ruby Hanson** (2018). Exploring Ghanaian Children Conservation of Number. *Journal of Information Technologies and Lifelong Learning*. https://doi.org/10.20533/jitll.2633.7681.2018.0005

46. **Ruby Hanson** (2018). Teacher Trainees' Interpretations of Chemical Stability and Chemical Reactivity. *International Journal for Cross-Disciplinary Subjects in Education*. https://doi.org/10.20533/ijcdse.2042.6364.2018.0474

47. Kwarteng Twumasi, A Sam, **R Hanson** (2018). USING COOPERATIVE LEARNING TO ENHANCE PUPILS'UNDERSTANDING ABOUT THE SOLAR SYSTEM IN THE AGORTIME-ZIOPE DISTRICT OF GHANA. *European Journal of Basic and Applied Sciences Vol*. https://www.researchgate.net/profile/Arkoful-Sam/publication/323701411_USING_COOPERATIVE_LEARNING_TO_ENHANCE_PUPILS'_UNDERSTANDING_ABOUT_THE_SOLAR_SYSTEM_IN_THE_AGORTIME-ZIOPE_DISTRICT_OF_GHANA/links/5aa6a4e50f7e9b463804d4d3/USING-COOPERATIVE-LEARNING-TO-ENHANCE-PUPILS-UNDERSTANDING-ABOUT-THE-SOLAR-SYSTEM-IN-THE-AGORTIME-ZIOPE-DISTRICT-OF-GHANA.pdf

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49. **R Hanson** (2017). Enhancing students' performance in organic chemistry through context-based learning and micro activities-a case study. *European Journal of Research and Reflection in Educational Sciences Vol*. https://www.researchgate.net/profile/Ruby-Hanson-3/publication/321384382_ENHANCING_STUDENTS'_PERFORMANCE_IN_ORGANIC_CHEMISTRY_THROUGH_CONTEXT-BASED_LEARNING_AND_MICRO_ACTIVITIES-A_CASE_STUDY/links/5a1fef040f7e9b9d5e02eb04/ENHANCING-STUDENTS-PERFORMANCE-IN-ORGANIC-CHEMISTRY-THROUGH-CONTEXT-BASED-LEARNING-AND-MICRO-ACTIVITIES-A-CASE-STUDY.pdf

50. **Hanson, Ruby**, Antwi, Victor, Ayim, Gertrude (2017). The Potential of integrating ICT into the Teaching and Learning of Chemical Bonds in Senior High Schools in Ghana - A Case Study. *Zenodo (CERN European Organization for Nuclear Research)*. https://doi.org/10.5281/zenodo.21574798

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doi.org/10.20533/ijcdse.2042.6364.2017.0419

52. A Sam, **R Hanson** (2016). Fusing Scientists' and Students' Conceptual Correspondences to Improve Teaching of Metal Complex Isomerism in Higher Education-An Educational Reconstructive Process. *International Journal of Academic and Reflection*. https://www.researchgate.net/profile/Ruby-Hanson-3/publication/291152964_FUSING_SCIENTISTS'_AND_STUDENTS'_CONCEPTUAL_CORRESPONDENCES_TO_IMPROVE_TEACHING_OF_METAL_COMPLEX_ISOMERISM_IN_HIGHER_EDUCATION-AN_EDUCATIONAL_RECONSTRUCTIVE_PROCESS/links/569e5f9b08ae502916633c48/FUSING-SCIENTISTS-AND-STUDENTS-CONCEPTUAL-CORRESPONDENCES-TO-IMPROVE-TEACHING-OF-METAL-COMPLEX-ISOMERISM-IN-HIGHER-EDUCATION-AN-EDUCATIONAL-RECONSTRUCTIVE-PROCESS.pdf
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54. **Hanson R.**, Twumasi A. K., Aryeetey C., Sam A., Adukpo G. (2016). Secondary School Students' Conceptual Understanding of Physical and Chemical Changes. *Asian Journal of Education and Training*. https://doi.org/10.20448/journal.522/2016.2.2/522.2.44.52
55. **Ruby Hanson** (2016). Using an Embedded Conceptual Strategy to Enhance Students' Understanding of Le Chatelier's Summation of Some Stress Factors on Equilibrium Position. *International Journal for Cross-Disciplinary Subjects in Education*. https://doi.org/10.20533/ijcdse.2042.6364.2016.0394
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58. A Sam, **R Hanson**, Ankrah Kwarteng Twumasi (2015). The model of educational reconstruction: scientists' and students' conceptual balances to improve teaching of coordination chemistry in higher education. *International Journal of Academic Research and Reflection*. http://www.idpublications.org/wp-content/uploads/2015/09/Full-Paper-The-Model-of-Educational-Reconstruction.pdf
59. **R Hanson**, TA Kwarteng (2015). Undergraduate chemistry teacher trainees' understanding of chemical phenomena. *European Journal of Basic and Applied Sciences*. https://scholar.google.com/scholar?cluster=17954453253376402359&hl=en&oi=scholarr
60. **R Hanson** (2015). Using micro science equipment to facilitate the study of qualitative analysis–a case study in an undergraduate class. *European Journal of Basic and Applied Sciences Vol*. http://www.idpublications.org/wp-content/uploads/2015/06/USING-MICRO-SCIENCE-EQUIPMENT-TO-FACILITATE-THE-STUDY-OF-QUALITATIVE.pdf
61. **Ruby Hanson**, Joyce Nsiah Asante (2014). An exploration of experiences in using the hybrid MOODLE approach in the delivery and learning situations at the University of Education, Winneba, Ghana. *Journals & Books Hosting (International Knowledge Sharing Platform)*.
62. **R Hanson** (2014). Chemistry Teacher-Trainees' Interpretations of Safety Rules and Symbols—A Case Study in Ghana. *International Journal of Innovative Research & Development*. https://scholar.google.com/scholar?cluster=3911440690183257660&hl=en&oi=scholarr
63. **RUBY HANSON** (2014). ENHANCING CONCEPTUAL UNDERSTANDING THROUGH INDIVIDUAL MICRO CHEMISTRY EXPERIMENTATION AND MOTIVATION IN A GHANAIAN SENIOR HIGH SCHOOL. *Projournal of Natural Science Research (PNSR)*. https://www.researchgate.net/profile/Ruby-Hanson-3/publication/264754115_ENHANCING_CONCEPTUAL_UNDERSTANDING_THROUGH_INDIVIDUAL_MICRO_CHEMISTRY_EXPERIMENTATION_AND_MOTIVATION_IN_A_GHANAIAN_SENIOR_HIGH_SCHOOL/links/53ee01880cf2981ada174424/ENHANCING-CONCEPTUAL-UNDERSTANDING-THROUGH-INDIVIDUAL-MICRO-CHEMISTRY-EXPERIMENTATION-AND-MOTIVATION-IN-A-GHANAIAN-SENIOR-HIGH-SCHOOL.pdf
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